Southeast Yukon Oil & Gas Training Needs Assessment

Prepared for
Advanced Education Branch
Department of Education
Government of Yukon

Jane Koepke
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NORTHERN RESEARCH INSTITUTE

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EXECUTIVE SUMMARY

This study was conducted in response to a mutual desire of the Government of Yukon, Liard First Nation, and communities of the southeast Yukon to prepare local residents to assume employment in the oil and gas industry. It is expected that the Government of Yukon, in its new role of proprietor of oil and gas rights, will issue exploration licences for the Liard Plateau region in the near future. The involved parties felt that a needs assessment could provide the basis for designing training to maximize potential employment opportunities. Emphasis in the needs assessment was given to determining:

- the types of jobs available in the upstream sector of the oil and gas industry;
- the skills and training required to access these jobs;
- existing levels of training and education in the southeast Yukon;
- and the training needs of the southeast Yukon.

The study was undertaken through a combination of industry canvassing and community-based research. The Southern Alberta Institute of Technology (SAIT) collected information on industry training requirements and expectations. The Northern Research Institute (NRI) of Yukon College designed and delivered a survey to assess the skills and education of residents of the Liard region with an interest in training for the oil and gas industry. This information allowed the NRI to determine what measures would be required to bridge the gap between industry's needs and the present training levels of the local labour force.

The results of the SAIT portion of the research indicated that the upstream sector of the oil and gas industry creates a wide range of occupations. These include industry-specific jobs, such as drilling rig and seismic workers, as well as jobs in "support" services, including heavy equipment operation and construction. Professional occupations, such as geologists and engineers, are also closely involved with the industry. The number of jobs created is greatest during the exploration phases of development; in contrast, the labour demand during later phases involving the production of petroleum resources can be minimal. Similarly, the proportion of entry-level job opportunities decreases markedly from the seismic and drilling phases to production.

The labour forces associated with seismic and drilling exploration can be characterized as upwardly mobile. On-the-job experience is critical to advancement from the entry-level to intermediate and advanced positions. Gaining experience requires not only a commitment of time but also a willingness to adapt to the demands of rotational employment, alcohol and drug abstinence, and group living in remote locations. The need for work experience has serious implications for the advancement of Northerners who are unlikely to find year-round oil and gas employment in their local region. To overcome

this barrier, it may be imperative for Northerners to gain experience in other jurisdictions in the "off" season.

The oil and gas industry upholds a set of standard safety training requirements for employees in industry-specific jobs. These include H2S Alive, Standard First Aid/CPR, and Workplace Hazardous Materials Information System (WHMIS). Depending on the duties they perform, workers may also need training in Chainsaw Safety, Transportation of Dangerous Goods (TDG), and Industrial ATV Safety. As oil and gas workers advance from entry-level to intermediate and advanced positions, they may take more specific training related to well blowout prevention, safe driving, and boiler operation.

The industry research conducted also indicated that there are generally no mandatory education requirements for industry-specific jobs. However, there is an expectation that workers in entry-level and intermediate jobs will have a Grade 9 and 10 education, respectively. The education requirements of occupations such as trade persons, gas operators, and professionals relate to the pre-requisites for entry into vocational or post-secondary programs.

The results of the human resources survey conducted in the Liard region indicate that a reasonable level of generic safety training already exists in the potential oil and gas labour pool, most likely due to high levels of previous participation in forestry, mining, and construction. The most widely taken courses included Standard First Aid, WHMIS, and Chainsaw Safety. The average level of education indicated by respondents was Grade 10/11 but it is likely that functional literacy skills are not representative of this. The responses gathered also indicated that local residents are highly inexperienced in the oil and gas industry. This points to the need to deliver more industry-specific training, such as H2S Alive and TDG, as well as provide assistance in coping with the demands of a new work context.

Several major issues were raised in the consideration of where and how training resources should be focused in the southeast Yukon. First, pre-employment requirements may be less stringent in the southeast Yukon to facilitate local recruitment. While this may stand to benefit residents in the short-term, it may also compromise their ability to gain experience in other jurisdictions. Second, the uncertainty surrounding the initial phases of oil and gas development subjects any industry-specific training to a considerable degree of risk in that the jobs may not materialize as anticipated. These issues illustrate the need to conduct training that emphasizes cross-jurisdictional coverage, high standards, and the transferability of skills to other sectors of the Yukon economy.

Conclusions arising from this report led to the formulation of a series of recommendations, some of which may have implications for the communities of the southeast Yukon, the Government of Yukon, and Liard First Nation.

They are as follows:

Primary Recommendations:

1. A brief evening information session should be held in early 1999 to introduce residents of the southeast Yukon to training that is planned for the region. Support and information pertaining to funding applications should be provided at this time. Ideally, the recruitment should target a group of approximately 16-20 individuals.

2. As the first component of pre-employment training, an orientation should be offered in early 1999 to familiarize participants with the nature of the oil and gas industry and its potential employment opportunities. This orientation should include an overview of all the phases of industry operation and the nature of rotational employment. Information about the education and training requirements for jobs should also be provided so that people can assess what potential they may have in the industry. In addition to prospective employees, community employment resource persons and high school guidance counselors should be invited to attend.

3. A basic safety training component should be delivered in early 1999. It would include courses in Standard First Aid/CPR, WHMIS, TDG, H2S Alive, Chainsaw Safety, Industrial ATV training, and Off-Highway Defensive Driving. Class sizes would have to remain flexible to accommodate those individuals who already meet some of these requirements. It is assumed that the majority of participants will require H2S Alive, TDG, Industrial ATV training, and Off-Highway Defensive Driving. Class sizes for the other courses may be substantially reduced. As well, some participants may only require re-certification for their First Aid/CPR and may be able to access this through pre-scheduled training in the community. The training could be delivered within a 7-9 day period by either Yukon or Outside resources.

4. In conjunction with industry orientation and safety skills training, a job readiness component should be provided for prospective oil and gas workers. Components of this training should include conflict resolution, anger and stress management, money management, substance abuse prevention, and preparation for mobility.

7. The communities and First Nations of the Liard region should investigate options for incorporating a literacy component into any training for oil and gas employment. An initial literacy assessment at the time of orientation could establish whether such measures may or may not be necessary. Additional advisory support and assistance could be provided for individuals who are uncertain as to whether they should seek upgrading.

Secondary:

8. The southeast Yukon should increase its capacity to deliver industry-specific courses such as H2S Alive, Transportation of Dangerous Goods, and Industrial ATV courses. A permanent resident in the area with experience in the industry would be an ideal candidate to equip with training skills. This individual could act as a permanent industry training resource in the area.

9. A feedback session with both trainees and representatives of geophysical firms should be held in the winter of 1999 to assess the strengths and weaknesses of the initial training provided. This feedback should seek information on job satisfaction, how many individuals intend to further their industry experience, and what barriers they may have in doing so. This feedback may also pertain to what support the communities of the southeast Yukon could offer to assist workers and their families.

10. The Yukon Worker's Compensation, Health, and Safety Board should explore the development of reciprocity agreements between the Yukon and other jurisdictions in terms of mandatory safety training for oil and gas. The Yukon should seek to clarify their position on the transferability of training that is offered in the Yukon and what additional measures may need to be taken to facilitate the cross-jurisdictional employment of Yukon residents.

11. Assuming that two geophysical surveys are conducted in 2000, a similar training program as that recommended for 1999 should be offered to a group of approximately 12 individuals. It may be subject to revisions evolving from the outcome of the aforementioned feedback session as well as activity and labour projections for that year. In 2001, about 10 local individuals should receive similar training.

12. To prepare for anticipated drilling in 2001, an additional training program should be offered in 2000 to about 40 individuals. This program should contain the same industry orientation and job readiness elements as previous training, as well as H2S Alive, TDG, WHMIS, and Standard First Aid courses. Additional training could be offered in Rigging and Hoisting, Confined Spaces Entry, General Entry Level Safety (GELS), and Airbrakes. As part of preparation for drilling work, driving training may need to be offered to a select group of candidates.

13. A local committee should be organized with the mandate to advise on matters pertaining to oil and gas employment in the southeast Yukon. The committee should investigate options for aiding local individuals in seeking off-seasonal or Outside oil and gas employment. A special training allowance could be allotted to encourage this method of gaining experience. Options should be explored for including "off season" literacy upgrading as a form of training. Individuals who do not wish to work in

oil and gas year-round could be funded to attend upgrading during the "off" season. Human resources persons in the southeast Yukon could strengthen their communications with recruiting offices and companies in the South to ensure that residents are made aware of potential opportunities Outside.

14. In cooperation with the local high school, an open house should be held for students to introduce them to opportunities in oil and gas. Representatives of the industry could be on hand to speak about the wide range of technical and professional jobs available. Guidance counselors should become well versed in the industry's career options.

15. The communities and First Nations of the Liard region should organize support groups for the families and spouses of workers in oil and gas. A support person should also be on-site during local seismic and drilling programs to assist local individuals in making adjustments to their new workplace.

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Shakir Alwarid	*Liard First Nation*
Shelagh Beairsto	*Department of Education*
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1.0 INTRODUCTION

Since the initial discovery of the Norman Wells oil field in 1919, both industry and local communities have struggled to overcome the obstacles to benefiting from oil and gas activity in the North. The employment and training of Northerners is an issue that has figured predominantly in this struggle, and one in which both parties have a vested interest. The ability of people to participate in nearby petroleum development can dictate the extent to which economic benefits will materialize in their communities. It may also serve to lessen the considerable economic risks for companies engaging in exploration and production in isolated regions by providing them with an easily accessible and stable labour force.

Historically, industry and government have taken joint responsibility for ensuring that an employable labour pool is developed in conjunction with oil and gas resources (Staples et al., 1989). Inevitably, they have faced many challenges in doing so. Northern people are disadvantaged not only by their distance from the established training resources of the south, but also by their minimal exposure to and understanding of the oil and gas industry. Communities hoping to benefit from oil and gas employment must first determine exactly what it is that their residents may need to prepare for, and how they may best do this. These questions provide the focus for the following study.

1.1 Study Background

In the Yukon, the concept of training local residents to access oil and gas employment is gaining new momentum. The *Yukon Oil and Gas Act* (YOGA), which was passed in Parliament in November 1998, transfers federal responsibilities for oil and gas resources to the Government of Yukon. It also develops a common regime in which the fourteen Yukon First Nations and the Yukon government can present a unified and consistent administrative environment for the industry to operate within. One of the first actions the Government of Yukon may undertake in its new role is the issuance of exploration licences for the Liard Plateau region of the southeast Yukon. This could initiate a period of increased interest and activity in the area, potentially culminating in the drilling for and production of petroleum resources.

This study was conducted in response to a mutual desire on the part of the Government of Yukon, Liard First Nation, and the communities of the southeast Yukon to focus on training as a means to maximize local employment from oil and gas exploration and production. The nature of the early stages of petroleum development is such that relatively little lead-time is often given in advance of projects. It was seen as imperative that the southeast Yukon take a pro-active stance with regards to employment, even at this preliminary stage. All parties agreed that a needs assessment could provide the framework for deciding what training may be needed to prepare for this relatively new industry.

In August 1998, a steering committee was organized to advise and oversee the needs assessment and the development of a training strategy. The committee consisted of members from Liard First Nation, Yukon College, the Department of Advanced Education, the Department of Economic Development, and the community of Watson Lake. Throughout the fall of 1998, the committee met on a monthly basis to discuss and direct the course of the project. In October, they were provided the opportunity to meet with industry representatives during an Oil and Gas Workshop hosted by the Department of Economic Development.

1.2 Study Objectives

The purpose of this study is to outline the training needs of residents of the southeast Yukon with respect to accessing anticipated employment in oil and gas. In developing the scope of this needs assessment, a number of objectives were established:

- to describe the phases of industry activity from oil and gas exploration to production;
- to identify the occupations that are available in oil and gas and provide estimates for the number of positions that may be created;
- to outline the minimum necessary skills and training needed for individuals to access these jobs;
- to assess levels of training and education of residents in the southeast Yukon;
- to develop a database of people interested in oil and gas to facilitate future employment and training;
- to determine what training is required to access employment and the capacity of Yukon and Outside institutions to provide this;
- to develop a short term strategy for training and consider the long term outlook for residents of the southeast Yukon.

All of the above elements are contained within the report, with the exception of the human resources database. This is intended to be a "living" resource for the purpose of facilitating training and employment of local residents in the early years of activity.

1.3 Study Approach

In conducting a training needs assessment for the southeast Yukon, advice and information was solicited from both the oil and gas industry and local residents. The industry aspects of the research were conducted by the Southern Alberta Institute of Technology (SAIT) in September 1998. A variety of sources – including industry associations, private contracting firms, training institutions, and petroleum producing companies - were canvassed in order to develop a broad picture of the employment opportunities and training requirements associated with oil and gas. The draft report that followed provided the basis for subsequent assessment and planning for the unique circumstances of the Liard region.

The Northern Research Institute at Yukon College conducted the local portion of the research. A human resources inventory of the southeast Yukon was carried out during late September and early October 1998. Drop-in sessions were held in Upper Liard, Watson Lake, and Lower Post, BC to allow interested individuals to complete a questionnaire pertaining to their skills, previous training, education, and training interests. In this sense, the needs assessment is informed by the responses of the potential trainees themselves, rather than broader statistics or data pertaining to the region.

Information on training resources and capabilities was accessed from a variety of sources, including educational institutions, training personnel, and industry insiders. This process in turn facilitated the development of a short-term training strategy by the steering committee, and the examination of long-term issues that may influence on training and employment in the region.

1.4 Application of Study

This study outlines the training that may be needed by residents of the southeast Yukon to access employment in oil and gas. A specific course of action may be prescribed but can not be implemented in isolation from the broader issues which will ultimately determine the future course of oil and gas development in the southeast Yukon. These include the progress of Liard First Nation's land claims negotiations and the status of the oil and gas market at the time of industry's decision to explore for resources in the southeast Yukon (Given, 1996).

Given the political and economic complexities involved, any predictions on future exploration and development in the Liard Plateau region must be made with some caution. The decision to channel energy and resources into training must recognize the risks of "moving ahead" amidst uncertainty. It is also a decision that indirectly asserts that inaction presents the equal or even greater risk of missed opportunity. The recommendations presented here are made with the assumption that the political and economic climate will favour exploration for petroleum resources in the Liard Plateau in the next several years. Specifically, the pre-employment training program outlined in Appendix E is based on the expectation that oil and gas rights in the area will be disposed to interested parties in the fall of 1999.

From the outset, the steering committee wished to conduct this needs assessment not only on behalf of the people of the southeast Yukon, but also those who may embark on this same process in the future. Several elements of the report, particularly those focusing on the employment opportunities and training requirements for oil and gas, have a broad application. This information is generic to most land-based oil and gas activity, and can be used to inform training and employment decisions in communities throughout the Yukon. While the utility of the human resources data is obviously limited to the southeast Yukon, the process behind it can also serve as a template. It is the hope of the committee that this project may lay the groundwork for many Yukon communities and First Nations in their efforts to seek lasting benefits from oil and gas resources in the future.

2.0 OVERVIEW OF THE OIL AND GAS INDUSTRY

The oil and gas industry may seem fairly commonplace to people in producing regions like Alberta, where it has long been entrenched in the economic and social fabric of communities. In "frontier" regions of the North, with little previous oil and gas development, the very opposite may hold true. The industry can appear to be a rather confusing entity to some, cast in unfamiliar terminology and science and involving a number of different players. Communities will need to overcome this information gap if they hope to become active partners with industry. The following sections examine how the industry generally conducts its business, providing the context for potential employment and training needs.

2.1 Upstream and Downstream Sectors

The oil and gas industry has two major components: the upstream producing sector and the downstream refining and marketing sector. The Canadian upstream sector includes more than 500 exploration and production companies, as well as hundreds of associated businesses such as seismic and drilling contractors, service and supply companies, service rig operators, engineering firms, and businesses that provide technical and scientific expertise (Kissuk, 1998). The downstream sector oversees the transport and distribution of the crude petroleum product to markets, and ultimately consumers. It consists of pipeline systems, refineries, gas distribution utilities, wholesalers, service stations, and petrochemical companies (Bott, 1993).

The entire upstream process – from exploring for to producing petroleum resources - is initiated with a producing company's decision to explore in an area. The exploration project must be economically viable with respect to several criteria:

- the size of reserves;
- the costs to develop these and bring them onstream;
- the geological and environmental risks;
- and the royalty structure (Kissuk, 1998).

The downstream process – that is, the distribution and marketing of petroleum – is confined by such factors as world prices, relative supply and demand, and the capacity of pipelines.

In the southeast Yukon, economic activity generated by the industry will be primarily in the form of upstream exploration and production. In light of its severely limited industrial capacity and distance from markets, the only notable downstream activity that may occur in the area would be the construction of tie-ins to link any discovered reserves with existing pipelines.

2.2 Phases of Activity

The upstream process – from exploration to production of oil and gas – is carried out in a series of stages. These are seismic exploration, drilling, and production. The following sections provide an overview of each stage of upstream activity. The downstream transport of oil and gas is also briefly considered in the last section.

2.2.1 Seismic Exploration

To minimize the economic risks associated with exploring for petroleum, petroleum producing companies have developed sophisticated tools to analyze underground rock formations and their potential to hold reserves of oil and gas. The seismic method is a remote detection technique that uses sound (or seismic) waves to provide information about the subsurface geology (Hardy BBT, 1987). Energy sources – usually explosives or hydraulic vibrators – are used to artificially generate seismic waves at locations called shotpoints. Series of sensitive geophones, or jugs, are used to record the waves that are reflected back from rock layers to the surface. The data is usually recorded in digital form and processed and interpreted by sophisticated computer programs. In areas where no drilling has taken place, seismic methods may be the sole source of information about the subsurface geology.

Firms that specialize in seismic operations are usually contracted to provide geophysical data for producing companies. Seismic companies typically belong to the 24-member Canadian Association of Geophysical Contractors (CAGC). Prior to "shooting" seismic, these firms will typically contract a slashing company to prepare and survey the area for the seismic crew. A slashing crew will be the first on the site, followed by those who will work specifically on the seismic operations. Geophysical surveys typically involve crews of about 50 persons; however, this may vary according to the scope and logistics of a particular exploration job (Kissuk, 1998). Heli-portable operations can be fairly complex and require additional personnel to coordinate the movement of people and supplies. Land-based operations are typically smaller in size. It is expected that the majority of geophysical surveys conducted in the Liard Plateau would be heli-portable operations.

2.2.2 Drilling

Seismic surveys can pinpoint the location of geological formations which have hydrocarbon potential, but only drilling can ultimately determine whether there are commercially recoverable quantities of oil or gas. In this sense, the drilling industry plays a vital role in the search for crude oil and gas.

The process is relatively simple: a revolving steel bit grinds a hole through rock at the bottom of a string of pipe, while a fluid called drilling mud acts as a lubricant and stabilizes the pressure in the well hole. As the bit penetrates deeper into the sub-surface, additional sections of pipe (or casing) may have to be added onto the string. Blowout preventer (BOP) devices are installed on top of the casing to prevent the buildup of pressure in the drill hole, and the uncontrolled release of environmentally harmful and often dangerous hydrocarbon fractions (Bott, 1993).

Rigs are owned by companies that specialize in drilling and provide their equipment and personnel to producing companies on a contract basis. These companies are usually members of the Canadian Association of Oilwell Drilling Contractors (CAODC). Rigs are hired by the day or meter drilled; the cost for drilling a deep well in the Rockies may range from 4-6 million dollars (Kissuk, 1998). Drilling may take place over a period of weeks to months, depending on the target depth and the relative hardness of the geological strata. Typically, drilling and completion of a well takes from 4-6 months (Kissuk, 1998).

Before drilling can commence, a survey company is contracted to locate the specific drilling sites. These locations must be provided as part of the application process for a drilling permit from the government (AECD, 1997). In addition to a survey plan, the producing company may also be required to submit archaeological and environmental studies on the project. Once the plan is approved, a construction firm is contracted to undertake the site preparation for drilling. This will entail the building of roads, bridges, culverts, pits, and the drilling site itself. This activity lasts about 2-4 weeks per well (Kissuk, 1998).

The precise location of the well is determined by the producing company's team of geological and geophysical specialists. The drilling engineer then plans the complete drilling operation from start to finish. The drilling of a well can employ upwards of 75 people, depending again on what infrastructure may already exist in the area and the complexity of the project (Bott, 1993). Specialized services, such as technical well testing and pumping, are contracted out to a variety of firms by the producing company. When target depth is reached, the producing company evaluates the data from the logging and testing to determine whether the well is economically viable. If it is, then a production casing is cemented into place and the rig is moved off the well site. If the well is not deemed to be viable, it is capped with cement and abandoned.

The company's production department will take on the task of bringing viable petroleum resources to the surface. A successful well is prepared for production in a process called completion. The casing is cemented into place to ensure the safe control of production. The drilling rig is subsequently removed and a smaller, truck-mounted service rig is brought in to complete the well. Sections of steel pipe called production tubing are installed from a wellhead, which acts as the regulator. The casing is then perforated to allow oil and gas to penetrate into the well bore. As well, the reservoir may be "stimulated" by physical or chemical means to encourage the movement of oil and gas to the surface. Gas wells normally have enough pressure to raise the product, and are controlled by a series of valves and instruments installed at the surface known as a "Christmas tree".

2.2.3 Production[1]

The production of crude oil and natural gas usually requires some degree of processing to remove undesirable components before the final product is transported to market. Relatively simple field facilities remove sand and water from the oil and gas stream and separate it into usable petroleum fractions. The natural gas purchased by consumers consists almost entirely of methane. At its place of origin, however, it is typically encountered along with heavier hydrocarbons, water vapor, and gases such as hydrogen sulphide, carbon dioxide, and nitrogen (Bott, 1993). It is the work of processing plants located near production areas to remove these unwanted substances from the gas stream.

The process is initiated by passing the raw gas found in wellheads through a gathering line and compressors. It is then heated to prevent freezing and condensation. In the gas plant, the gas is chilled to separate the methane from the gas liquids. After the hydrogen sulphide has been removed with the use of catalysts, the remaining gas compound meets specifications for transport via a pipeline.

The construction of gas processing facilities and gathering lines may actually occur far from the gas field. Most equipment - such as separators, treaters, and compressors – is fabricated in southern centres such as Calgary and Edmonton (Kissuk, 1998). It is then mounted on skids and hauled to the production site for installation. The installation is carried out by engineering construction firms that are contracted by the producing companies. A considerable number of workers, particularly tradespeople, participate in the assembly of gas processing facilities.

Once the gas wells are brought onstream with gathering lines or pipeline tie-ins, the processing facility operates for the remainder of the life of the field. Gas facilities are highly automated and mechanized, and require a small number of specialists to ensure that operations run smoothly.

2.2.4 Transportation

Canada's oil and gas reserves are located primarily in rural and remote areas in western Canada, the Arctic, and the offshore – far from the consumers in the South who depend on these resources. Thus, oil and gas must be transported from its place of origin to the markets that demand them. In Canada, this is accomplished by about 284,000 kilometres of pipelines (Bott, 1993). Pipelines vary in size from a few centimetres to several metres in diameter, and are typically buried underground. Compressor stations are placed along major transmission lines to speed the movement of gas over long distances.

The Westcoast Pipeline currently runs from the Mackenzie Valley to Fort Nelson and connects to markets in BC and the US Northwest. It distributes the 1.3

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[1] The discovered and potential resources of the Liard Plateau are predominantly natural gas formations. Thus, the discussion pertains to this particular aspect of production.

million cubic metres of gas that is produced daily from the Kotaneelee field in the far southeast corner of the Yukon (Department of Economic Development, 1997). The pipeline currently has excess capacity, so it is probable that new construction would be limited to tie-ins from new gas fields (CERI, 1996).

2.3 Development Timelines

The entire upstream process – from exploration to production – is a long-term undertaking. Assuming that the results of subsequent programs of exploration favour bringing oil and gas resources onstream, development in an area may take place over a period of 20-25 years (SAIT, 1998). The particular circumstances of a project will dictate its exact duration, but broad projections can provide some indication. Using a 25-year scale for oil and gas development, the following timelines give an approximation of how development may proceed in a region:

Years 0-4: Seismic exploration is conducted in an area.
Years 3-5: Exploratory drilling and completions are carried out.
Years 4-6: Wells are developed for production and gathering and processing facilities are constructed.
Years 5-25: Wells are brought onstream and produced. The life of the field may range from 15-20 years.

Please refer to Figure 2.1.

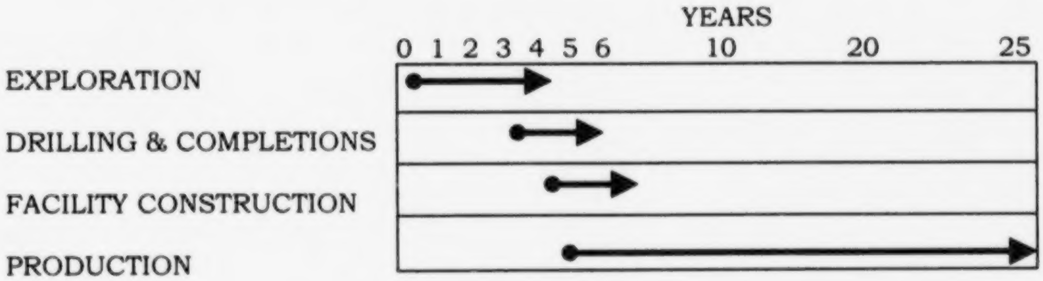

Figure 2.1 Development Timelines in a Region

The first three stages of development produce fairly short-term, intense bursts of economic activity and job creation in a region. The production stage is considerably longer in duration, but entails a high level of automation and subsequently fewer jobs. These issues are discussed further in the following sections.

3.0 EMPLOYMENT IN THE INDUSTRY

The decision to train for oil and gas employment, both at the individual and community level, needs to be informed by a basic understanding of the opportunities that are available in the industry. An individual who is aware of the potential jobs and their pre-requisites can assess what options may be open to them given their skill levels and experience. Communities can more effectively prepare if they have a realistic picture of the types and numbers of jobs that might be created and the types of training that will be expected to precede them. The following section discusses employment and training issues as they pertain to the development of oil and gas in frontier regions.

3.1 Occupations

The oil and gas industry offers employment in a wide range of occupations. Work opportunities vary according to the stage of development and the specific activities that are carried out. The following sections introduce the occupations that are available in seismic activities, drilling operations, and gas production. Professional and environmental occupations are given separate consideration in the last two sections. Appendices A and B contain more comprehensive information on the skill requirements and duties associated with the jobs italicized in the seismic, drilling, and production sections.

3.1.1 Seismic Activity

Seismic surveys typically involve crews of about 50 people (Kissuk, 1998). This figure may vary according to the relative complexity and size of the operation, however. Heli-portable and three-dimensional operations, for example, may require additional staff to help expedite and coordinate the surveys. Seismic crews generally consist of a number of smaller work groups who are responsible for specific aspects of the operation.

3.1.1.1 Preparation for Seismic

A slashing crew conducts the advance cutting and slashing of the seismic lines and is typically made up of a *lead cutter,* two *buckers,* and a *packer.* Lead cutters are responsible for the crew and most of the heavy falling. Buckers cut up the felled trees and slash brush, and perform maintenance on the saws. Packers assist the lead cutter and buckers by carrying the day's gas and supplies, and helping to slash and clear trails.

A survey crew comprised of a *survey chief* and *helper* will follow behind the slashing crew. They utilize electronic measuring devices, global positioning systems, and other equipment to locate and flag the positions of the geophones and shotpoints.

3.1.1.2 Seismic Tests

Once the seismic lines have been cleared and surveyed, the seismic drilling crew can proceed to set up the explosives. *Seismic drillers* drill and load the boreholes into which explosives are placed to produce the seismic waves. *Driller helpers* assist by transporting equipment and drilling very basic problem-free holes. Typically there is one driller and several helpers working on a survey (Kissuk, 1998).

Shooters and *shooter helpers* are responsible for organizing the equipment used to set off the explosions. They take part in laying the electrical cables and connecting explosive charges, monitoring equipment during the seismic test, and transporting and inventorying the explosives. Helpers may also guard the area during shooting activities. During seismic tests, shooters maintain close communications with the recording crew. Again, one shooter usually works with one or two helpers (Kissuk, 1998).

A *vibrator operator* is required when a hydraulic vibrating unit is used, as opposed to explosives, to generate seismic waves. The unit is mounted on a medium sized buggy or tracked vehicle which has a large plate attached underneath. The vibrator operator handles and adjusts the controls that position the plate in coordination with the recording crew.

Once the cables are laid and explosives or vibrators ready, the recording crew will coordinate the actual seismic test. *Seismic observers* operate instruments that record the results of seismic tests and coordinate the activities of other crew members. During seismic tests, observers work inside a recording truck, using two-way radios to communicate with others. Observers may activate the explosives from controls in the recording truck, or direct shooters to do so from their positions in the field. *Observer helpers*, also called "jug hustlers", help prepare the recording activities by hauling and connecting cables, geophones, and other recording equipment. Typically, one observer works with a crew of five or more helpers (Kissuk, 1998).

On more complex surveys, there is a need for extra personnel to ensure that operations run smoothly. *Staging managers* organize the deployment of personnel and equipment during heli-portable operations. *Line crew bosses*, also called "line truck drivers", coordinate the boarding and exiting of helicopters and transport personnel and equipment to and from field operations. *Troubleshooters* work directly under seismic observers and solve equipment problems. On some surveys, as many as three troubleshooters may be needed (AECD, 1997). Typically, there is a need for only one troubleshooter, one line crew boss, and one staging manager on a survey.

A *seismic supervisor,* usually called a party manager, coordinates the activities of an entire seismic crew. He or she works in conjunction with a number of field supervisors who are responsible for smaller crews. He or she makes the necessary arrangements to prepare locations for seismic tests, organizes the operation, and ensures that the work is conducted safely.

3.1.1.3 Camp Operation

In remote areas, cooking and sleeping facilities may also have to be provided for the seismic crews. Camp operation is the responsibility of a crew of about four individuals, who look after cooking, cleaning, and general maintenance. The *cook* looks after planning menus, ordering supplies, and preparing meals. He or she will have a *cook's helper* to assist in preparing and serving food. A *camp attendant* will perform basic housekeeping duties such as making beds, doing laundry, and washing floors.

3.1.2 Drilling Operations

The drilling of an oil or gas well is an extensive undertaking which may employ upwards of 75 people engaged in work ranging from manual labour to specialized testing (Bott, 1993). In general, a drilling operation proceeds in a series of stages in which a number of smaller crews carry out specific tasks.

3.1.2.1 Preparation for Drilling

A slashing crew, consisting of *slasher/fallers*, *buckers*, and a *skidder operator*, clears the "right of way" for the site so that it may be surveyed. As many as eight *slasher/fallers* will perform most of the heavy falling and slashing. One or two buckers will buck the fallen trees, and may do maintenance on the saws. The skidder operator drags and moves trees felled and bucked by the lead cutter and bucker.

A legal survey of the drill site is conducted by a *survey chief* and a *helper*. Using electronic measuring devices and other equipment, they mark the boundaries of the site and note contours and other landscape features. The survey plan is required as part of the application for a drilling permit from the government.

Heavy equipment operators are needed to excavate and grade an area during the construction of facilities and road infrastructure. The equipment used includes packers, crawler tractors, backhoes, graders, and trucks. There are usually from four to six heavy equipment operators working on a drill site. Heavy equipment operators help construct the well site, roads, pits, and bridges. As well, they perform road grading and maintenance, and access gravel for the site. *Truck drivers* are required both during and after construction to transport goods and materials along supply routes to the field. The number of truck drivers required varies with the size of the rig, but is typically around eight (Bott, 1993). *Swampers* assist truck drivers both on the field and off.

Camp operation is carried out by a crew of about four individuals who look after cooking, cleaning, and general maintenance. The *cook* is responsible for planning menus, ordering supplies, and preparing meals. He or she will have a *cook's helper* to assist in preparing and serving food. A *camp attendant* will perform basic housekeeping duties such as making beds, doing laundry, and washing floors. One or two *labourers* will also be on hand to conduct basic maintenance and construction around the camp.

3.1.2.2 Drilling

Throughout the life of the drilling project, a number of miscellaneous positions are created in the camp. The *gatekeeper* looks after security matters around the site, and a *safety officer* is required to ensure that working conditions are satisfactory and safe. An *environmental monitor* may be on hand to ensure that the environmental obligations of drilling agreements are met and to report regularly to government and First Nations. A *heavy equipment mechanic* and a *welder* are also needed on-site to maintain and repair various machines and equipment. All of these positions employ about one person each; the environmental monitor and safety officer may only work half-time, however (Kissuk, 1998).

The actual drilling is carried out by three 5 or more-person rig crews and a drilling supervisor. The junior positions on a crew include a *leasehand* and several *floorhands*. Floorhands and leasehands perform a variety of labourer tasks on or around oil and gas drilling and service rigs. Leasehands work predominantly around the rig site, assisting other crew members and cleaning equipment. Floorhands work specifically on the rig floor, helping connect and disconnect the drill pipe, doing "housekeeping", and assisting other crew members.

Working alongside the floorhands and leasehand in more senior drilling crew positions are the *derrickhand*, *power tong operator*, one or two *power tong helpers*, and a *motorhand*. The derrickhand works high above the rig floor on a platform called a monkeyboard, guiding lengths of pipe into the elevators. He or she also performs maintenance tasks, prepares mud reports, and helps the driller. The power tong operator connects the casing being lowered into the well using a set of hydraulic power tongs. He or she also supervises the power tong helpers, floorhands, and derrickhands in the use of hoisting equipment. The motorhand looks after the diesel and electrical engines, which power the drilling equipment, and helps train floorhands and leasehands.

The most senior positions on a drilling rig are the *driller* and *drilling rig manager*. The driller oversees the activities of a drilling crew and reports to the rig manager on progress. He or she is also responsible for maintaining and testing the blowout prevention (BOP) equipment. The drilling rig manager, or toolpusher, coordinates the activities of all drilling crews, ensures compliance with government regulations, and organizes areas for drilling.

3.1.2.3 Well Servicing and Testing

A service rig crew has a structure fairly similar to a drilling rig crew, but the specific occupations and job duties may vary somewhat. A service rig crew typically consists of a *floorhand trainee*, two *floorhands*, one *derrickhand*, a *service rig operator*, and a *rig manager*. Floorhands on service rigs perform similar duties to those on drill rigs but may be more involved in the operation of engines, pumps, and motors that power various components of the rig (AECD, 1997). Derrickhands on service rigs will spend a greater amount of time working up in the derrick. As well, the operator on a service rig – essentially the equivalent of the driller on a drilling rig - is primarily concerned with lowering equipment to pull up broken tubing, casing, and pump rods. The rig manager performs the same basic duties as those described in the previous section.

Oil and gas well loggers and testers will work in close contact with drilling and service rig crews to provide a variety of services required for drilling, completions, and servicing. As many as seven or more people are needed to operate specialized tools and equipment related to logging, coring, testing, cementing, and pumping the contents of the well (Kissuk, 1998). A *mudlogger* analyzes the mud from the well to better understand the nature of the subsurface formation. A *coring operator* and a *helper* take samples from the drilling core, record and store them, and pass them onto the well site geologist to analyze. Two *drill stem testers* conduct special tests on fluids originating from the rock formation to help determine the productivity of a well. A *wireline operator* and a *helper* lower special instruments such as electrical logging equipment into wells using a wireline.

Well service pump equipment crews are used at different times throughout the development of a well to inject compounds such as cement, acids, and nitrogen. A *pump equipment operator* and several *helpers* are responsible for the pumping operations of one truck. Typically, they will specialize in cementing, acidizing, or nitrogen injection services. Job titles will vary according to the type of service provided; for example, a cementing crew will be comprised of a cementer and cementer helpers.

After drilling is completed, a reclamation crew restores the site to its original condition. A crew is composed of *heavy equipment operators, tree planters*, and *labourers*. They are responsible for grading the site, cleaning up debris and chemicals, and planting vegetation. There are usually six to eight people employed for reclamation purposes (Bott, 1993).

3.1.3 Oil and Gas Production

The later stages of oil and gas development are quite specialized in terms of their activities and the occupations they create. The construction of facilities to collect and process the oil and gas can be an extensive undertaking that employs many people. Once a field is in operation, however, only a small crew remains to oversee the processing operations. These jobs constitute the only consistent employment in the industry in the sense that people can work at one site for many years.

3.1.3.1 Facility Construction

The preparation for oil and gas production requires the assembly of specialized equipment and materials that are fabricated in larger centres and hauled to the site. This may involve about 25 workers (Bott, 1993), depending on the extent of the producing area and whether additional pipeline infrastructure is required. A number of tradespeople participate in this phase of development. These include *pressure welders, steamfitter-pipefitters, plumbers, carpenters, electricians, insulators, painters, structural steel* and *iron workers*, and *concrete finishers*. Usually one person is required for each trade; however, an electrician or carpenter may require a *helper*.

During both the construction phase of oil and gas production, a variety of other jobs may be created. A *heavy equipment operator* is needed to operate a variety of machines around the site. An additional *catskinner* will operate the crawler tractor. A *labourer* is on-site to perform a variety of duties, such as moving and handling equipment and supplies. A *field clerk* keeps company records and time sheets, and a *safety officer* ensures safe and satisfactory working conditions. The *construction foreman* supervises and directs the installation of facilities, makes daily work plans, and organizes the transport of materials to the site. A *surveyor* and a *helper* conduct a legal survey of the site. An *oral history specialist* may also be on hand to provide information about history, archaeological information, and other local knowledge. The site will also require the services of a *tank truck operator* and a *vacuum truck operator* to transport bulk liquids, sewage, etc. to and/or from the site. Some of these jobs, such as the field clerk and a heavy equipment operator, may remain after the field is brought into production. Others will be needed sporadically, such as truck drivers and various tradespeople who are responsible for occasional repairs or maintenance.

3.1.3.2 Field Production

A crew of 6-10 people will look after the production of oil or gas for the life of the field (Kissuk, 1998). The available positions include *gas field production operator* and several different types of *gas plant operators*. A field production operator oversees the initial separation processes which remove impurities such as water and sediments from oil and gas in the field. He or she will be responsible for a number of wells which they must travel to during the day. Gas plant operators are needed to oversee the day-to-day operations of the automated gas processing facility. They include *junior operators*, *unit operators*, *senior operators*, and *plant foremen*. Junior operators, or trainees, work in specific units of the plant under the direction of unit operators. They will perform various tests and make regular checks of operating parameters. Unit operators are responsible for the smooth functioning of their particular unit, while senior operators supervise a number of units. Senior operators work in control rooms where there are a number of control panels to monitor the proceedings in individual units.

An *instrument mechanic* is usually required on site to install, maintain, and repair the measuring and control instruments and associated equipment within a plant. A *millwright* is also needed to install, maintain, repair, and troubleshoot machinery and mechanical equipment within the gas plant including pumps, compressors, cooling systems, electric motor repair, and natural gas and diesel powered stationary engines.

3.1.4 Professional

In addition to the occupations previously introduced, there are a large number of professionals[2] that the industry relies on to conduct its activities. They provide expertise in matters relating to the land acquisition, geology, engineering, and surveying aspects of some or all phases of petroleum resource development. Professionals are involved throughout the development of oil and gas resources, and generally contract out their services or work directly for producing companies.

Land agents help producing companies acquire and administrate dispositions for surface rights in an area. They negotiate exploration and production agreements between companies, First Nations, and various levels of government. They may also look after compensation arrangements for parties affected by development.

Petroleum geophysicists look for oil and natural gas using the principles of mathematics, physics, and geology. Using information gathered from sediments, mineral compositions, and rock structure, they can determine the probable location of deposits. They may specialize in any or all of the following areas: data collection, data processing, or data interpretation.

Petroleum geologists apply their knowledge of the nature and history of the earth's crust to explore for and develop oil and gas resources. They utilize a number of tools – including geophysical and geochemical data, maps, rock samples, and remote sensing imagery - to ascertain where oil and gas may be located. Their knowledge and expertise also assists petroleum engineers in their efforts to maximize the extraction of resources from an underground reservoir.

Geological and *geophysical technologists* usually provide technical assistance to geologists, geophysicists, and petroleum engineers. They may prepare samples and perform laboratory tests, assist in the evaluation and analysis of data, and report on results. They may also be responsible for overseeing aspects of seismic operations, drilling, and well completions.

Petroleum engineers apply the principles of geology, physics, and engineering to recover, develop, and process oil and gas. They work closely with geologists, geophysicists, and technologists. In general, petroleum engineers will devise drilling plans, evaluate progress, and make necessary adjustments to ensure maximum productivity.

Petroleum engineering technologists conduct many of the technical activities involved in the production of oil and gas. Their skills are applied to well drilling, production, the evaluation of subsurface formations, and reservoir engineering. They may conduct specialized tests, oversee drilling operations, and make calculations on hydrocarbon reserves.

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[2] These occupations are designated "professional" by virtue of their accompanying levels of education and expertise, and the certification they may hold with professional associations across Canada.

Land surveyors plan, conduct, and direct legal surveys using a variety of instruments to determine and interpret the location of landscape and man-made features. These instruments include electronic distance measuring equipment, global positioning systems (GPS), computer drafting techniques, and geographical information systems (GIS).

Surveying technologists, or geomatics technologists, work alongside land surveyors, engineers, and other technologists to conduct field surveys. They use a wide variety of surveying and computer equipment to aid in legal surveys, mapping projects, and other geomatics-related work.

3.1.5 Environmental

Oil and gas operations can have significant impacts on the local environment. Governments and the industry conduct environmental studies of areas that are slated for development to better understand their wildlife and habitats, unique features, traditional uses, and other characteristics. Seismic, drilling, and production activities can then be designed to minimize the impact on the area.

Traditional land use, community liaison, and *traditional ecological knowledge advisors* may be required in the early phases of project scoping and assessment. The traditional land use advisor is typically an Elder of the local First Nation who has extensive knowledge of the lands in the area. He or she will provide an overview of the traditional uses of the land to an environmental study team. The community liaison advisor acts as a go-between for environmental consultants, producing companies, contractors, government, First Nations, and the community. The traditional ecological knowledge advisor has an intimate understanding of the flora and fauna of an area and contributes expertise where needed.

3.2 Labour Demand and Skill Level

The extent of job creation resulting from oil and gas resources in an area is affected by a host of factors. The projected scope of oil and gas development in an area is an obvious one. Mega-projects, such as those envisioned for the Beaufort in the 1970s, will have a significantly greater labour demand than small-scale exploration and production programs. Competition with other proximal communities for jobs and business is another factor. In remote regions of the North where there is minimal industrial, labour, or transportation infrastructure to satisfy the needs of a project, oil and gas firms tend to base their operations out of established centres (DPA Group, 1987). The terms of exploration and drilling agreements provide for local hire and business development from upstream activities, but they can do so only to the extent that the profitability of projects is not unduly compromised from the perspective of industry. If skilled labour and established service providers are available in other convenient locations, it can be expected that they will be utilized.

Despite these contingencies, it is still useful to consider the potential magnitude of employment that oil and gas activity can create and the skill levels involved.

The following sections provide a brief overview of the labour requirements of upstream activities as they relate to entry-level, intermediate[3], and advanced[4] levels of employment. The figures presented were derived from information from SAIT and the Petroleum Communication Foundation and are intended to represent average labour demand. Please refer to Appendix A for a listing of job opportunities at each level.

3.2.1 Entry-level Positions

In the early stages of oil and gas development, there are substantial opportunities at the entry-level in positions such as helpers and labourers. Of the 50 persons employed on an average seismic crew, about 1 in 3 are in entry-level jobs. A slightly greater proportion of the jobs available on an average 75 person drilling crew are at the entry-level. These figures decrease for the construction and production phases of gas development, where the work becomes increasingly technical and specialized. In general, the highest demands for labour will be during the seismic and drilling phases of activity. Please refer to Table 3.1.

Table 3.1 Entry-level Labour Requirements

	Seismic	Drilling	Construction	Production[5]
Number of entry-level jobs	18	29	3	2
Total crew personnel	50	75	25	8
Percentage of entry-level jobs	36%	39%	12%	25%

3.2.2 Intermediate Positions

Opportunities at the intermediate level take up a significantly greater proportion of the available jobs in the upstream sectors of activity. About half of the positions created for seismic, drilling, and facility construction can be classified as intermediate positions. Approximately one quarter of the labour demand for the field production of gas is at the intermediate level. Please refer to Table 3.2.

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[3] Describes employment that can be accessed by individuals with demonstrated work-related skills and experience in a particular field.

[4] Describes employment that can be accessed by individuals with advanced competencies, skills, and experience in a particular field.

[5] Entry-level jobs at the production stage differ somewhat from the other stages; average minimum education requirements may be significantly higher.

Table 3.2 Intermediate Labour Requirements

	Seismic	Drilling	Construction	Production
Number of intermediate jobs	25	34	11	2
Total crew personnel	50	75	25	8
Percentage of intermediate jobs	50%	45%	44%	25%

3.2.3 Advanced Positions

Oil and gas occupations become less labour intensive as the stages of development proceed and are accompanied by a higher degree of technical skill and experience. In the seismic and drilling phases of activity, less than 1 in 6 positions created can be classified as advanced. In contrast, almost 1 in 3 of the jobs available for facility construction are advanced occupations in the trades. Approximately half of an average eight person crew at a gas processing facility fill advanced positions. Please refer to Table 3.3.

Table 3.3 Advanced Labour Requirements

	Seismic	Drilling	Construction	Production
Number of advanced jobs	7	12	7	4
Total crew personnel	50	75	25	8
Percentage of advanced jobs	14%	16%	28%	50%

3.3 Training and Qualifications

The training and qualifications required for work in oil and gas are influenced primarily by the industry's aims to minimize costs, maximize productivity, and avoid liability. It is the latter objective, in particular, that bears most heavily on initial employment. Companies protect themselves against undue liability by ensuring that their employees meet recognized standards of safety. These standards are designed and upheld by a number of bodies within the industry. These include: regional Workers Compensation, Health, and Safety Boards (WCHSBs); Petroleum Safety Council (PSC); Petroleum Services Association of Canada (PSAC); Petroleum Industry Training Service (PITS); professional industry associations; and the companies themselves. Together, these parties promote a minimum level of safety knowledge and competency for both new and experienced employees.

Safety is only one aspect of training and qualifications, however. As the nature of oil and gas operations becomes increasingly technical and specialized, the importance of skills-based knowledge becomes paramount. In general, the level of experience and training required will correspond to the relative complexity or danger of the job itself. This need not be a barrier for those with little or no previous experience, however. The upstream oil and gas sector presents an upwardly mobile labour force in which solid performers can generally advance to positions of greater responsibility. The following sections consider the training and qualifications that apply to the entry-level, intermediate, and advanced occupations associated with upstream activities. Please refer to Appendix C for a comprehensive listing of training and education requirements.

3.3.1 Seismic and Drilling

Initial employment in seismic and drilling operations is usually at the entry-level. As seismic and drilling work is highly specialized, advancement in a crew requires considerable field experience and the acquisition of additional training where required. Seismic and drilling labour is upwardly mobile in nature; that is, workers who enter with no experience can expect to progress to positions of greater responsibility if they commit their time and effort.

3.3.1.1 Entry-level Positions

Most entry-level positions in seismic and drilling are available either directly on crews or in camp support positions. There are generally no minimum education requirements for entry level positions on seismic and drilling operations, but companies prefer to hire individuals with a Grade 9 education or higher (Carnew and Associates, 1998). A Class 5 driver's licence is also desirable.

A basic set of safety certificates are required by most seismic and drilling contractors to access positions on slashing, seismic drilling, shooting, recording, and well drilling crews. These are Standard First Aid and CPR[6], H2S Alive[7], and Workplace Hazardous Materials Information System (WHMIS)[8]. These basic safety requirements apply to all entry level jobs available on seismic and drilling crews. In addition, job-specific training may be taken by some workers. For example, members of slashing and seismic crews who operate quads and chainsaws require Industrial ATV[9] and Chainsaw Safety[10] courses (Kissuk, 1998).

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[6] Describes basic first aid and CPR training provided by St. John Ambulance or Red Cross. Certificates are valid for 2 or 3 years (CPR should be re-certified after 1 year).

[7] An industry-standard course developed by PITS to protect workers who may be exposed to the dangers of hydrogen sulphide. Certificates are valid for 3 years.

[8] Describes specific training designed in accordance with the federal Hazardous Products Act and provincial and territorial Occupational Health and Safety Acts. Certificates are valid indefinitely.

[9] A safety orientation course for All Terrain Vehicles that has been developed by the Canada Safety Council and is WCB recognized in Alberta and BC. Currently, WCB regulations require this training for all employees on seismic operations. Certificates are valid indefinitely.

[10] A generic safety orientation course that is generally developed either by, or in conjunction with, the governing WCB and federal and provincial safety councils. Certificates are valid indefinitely.

Swampers and pump equipment operator helpers may not require the same basic safety training as other crew personnel in entry-level positions. However, they will require a valid Class 5 licence and may need Transportation of Dangerous Goods (TDG) [11] certification in order to drive trucks on seismic and drilling sites. Positions that provide support to the seismic and drilling crews - such as labourer, tree planter, gatekeeper, cook's helper, and camp attendant - require little or no training and qualifications.

3.3.1.2 Intermediate Positions

Intermediate positions in seismic and drilling operations include crew work, camp support staff, heavy equipment operators, well loggers and testers, and truck drivers. There is no mandatory education requirement for the majority of these positions; however, there is an expectation that people at this level of responsibility would have a minimum Grade 10 level of education (Carnew and Associates, 1998). Ideally, well loggers and testers will have acquired a high school diploma (AECD, 1998). A minimum Class 5 driver's licence is usually required to advance to intermediate positions.

The basic qualification for intermediate jobs on slashing, seismic drilling, shooting, recording, and well drilling crews is on-the-job experience. Workers start in helper positions and progress after having worked several seasons at a satisfactory level of competency. Intermediate crew workers are expected to keep their basic safety certificates current. Some personnel may require further job-specific safety training as well. For example, seismic drillers and shooters may require a Seismic Blaster's Safety Training[12] course (Kissuk, 1998). Line crew bosses and other crew members who operate light or heavy duty trucks in the field may require not only TDG, but also driving improvement[13] courses (Carnew and Associates, 1998). In general, workers can advance more quickly by taking additional coursework in seismic and drilling operations.

Camp support positions may require a wide range of training, depending on the duties involved. Most cooks employed in remote drilling and seismic camps require a camp cooking or chef's certificate or will have considerable on-the-job experience. They may also require a Foodsafe[14] course. Safety officers generally require Standard First Aid and WHMIS and have a considerable knowledge of WCB laws and regulations (Kissuk, 1998). An environmental monitor has no formal safety training requirements but would have an intimate knowledge of the local area and its customs.

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[11] Describes specific training designed to meet the requirements of the federal Transportation of Dangerous Goods Act and its accompanying regulations. Certificates are valid for 3 years.

[12] Describes a course developed in part by the Canadian Association of Geophysical Contractors (CAGC) to provide an industry training standard for seismic blasting. Certified by PITS, the course is valid for 5 years.

[13] Driving improvement courses may be offered by individual companies, or personnel may upgrade skills through specific industry standard courses. These include the PITS developed and certified Light Duty Vehicles Driver Improvement, General Oilfield Driver Improvement, and Oilfield Haulers courses.

[14] Foodsafe courses are designed in accordance to the British Columbia and Yukon Restaurant and Food Services Association guidelines for food sanitation. Level 1 is designed for food servers, and Level 2 is geared towards managers. Certificates are valid indefinitely.

Heavy equipment operators and truck drivers may require a complete set of basic safety certificates, as well as TDG. Heavy equipment operators may additionally require Industrial ATV training, Chainsaw Safety, and a Traffic Control ticket (Carnew and Associates, 1998). Truck drivers typically need a Class 1 motor vehicle licence with airbrakes endorsement. Those who are specifically operating in and around oil and gas fields may also need industry-specific driving training. Previous on-the-job experience operating heavy equipment and trucks is preferred by most employers.

Oil and gas well loggers and testers typically have drilling or service rig experience and a high school education. They are trained on-the-job in helper positions until they are fully qualified. They may not be required to have the same basic safety certificates as other workers, with the exception of wireline operators. This position requires Standard First Aid, a Class 3 licence, TDG, and Seismic Blaster's Safety Training (AECD, 1997).

3.3.1.3 Advanced Positions

Advanced positions on seismic and drilling operations include recording and drilling crew work, operations coordination, surveying, and work in the trades. A high school diploma is the minimum level of education required to progress to this level of responsibility. Drillers and tradespeople may require only a Grade 10, however. A technical diploma is needed for surveyor chief work, and party managers may have post-secondary training in electronics (AECD, 1997). A minimum Class 5 driver's licence is required for most advanced occupations.

Again, the basic qualification for senior positions on drilling and seismic crews is on-the-job experience. Seismic observers generally start out as helpers, and gain several years of experience before they are ready to assume advanced work. After working in observer positions for several seasons, they may progress to party manager. Drillers/operators also start out in junior positions on rig crews and advance according to their duration of employment and job performance. The position of rig manager can be attained by a conscientious, hard working individual within 8-10 years of experience on a rig (Kissuk, 1998). Individuals can expect to advance more quickly by taking additional coursework in different aspects of drilling or service operations.

Most senior personnel on seismic and rig crews are expected to keep their basic safety certification current. They will also require advanced training to supervise operations. Drillers are generally certified in First Line Supervisor's Blowout Prevention (BOP)[15]. Service rig operators will need Well Service Blowout Prevention[16] and Special Oilfield Boiler's[17] tickets (Kissuk, 1998). Drilling rig managers will generally require a Second Line Supervisor Well Control certificate[18] and Special Oilfield Boiler's training. Party managers may not need any specific safety certification, as their role is in coordination, not hands-on fieldwork.

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[15] Industry standard course developed by Petroleum Industry Training Service (PITS) for drilling rig supervisors. Certification is valid for 3 years.

[16] Industry standard course developed by Petroleum Industry Training Service (PITS) for service rig operators and supervisors. Certification is valid for 5 years.

[17] Industry standard course developed by the Alberta Boiler Safety Association (ABSA) for rig personnel operating oilfield boilers. Certificates are valid for 1 year.

Welders and heavy equipment mechanics require journeyman certification, generally gained through 3 or more years of combined classroom training and apprenticeship work. Most apprenticeship programs require a minimum Grade 10 level of education (HRDC, 1997).

3.3.2 Facility Construction

The construction of gas processing facilities and gathering lines requires a very different set of skills and training than do seismic and drilling. There are significantly fewer opportunities at the entry-level. Essentially, the work is geared towards individuals who are already at a high level of proficiency and experience.

3.3.2.1 Entry-level Positions

Entry-level opportunities in facility construction include labourer and electrician's helper positions. There are no mandatory education or training requirements, but a minimum Grade 9 education is generally preferred. A Class 5 driver's licence would also be an asset.

3.3.2.2 Intermediate Positions

Intermediate work in facility construction involves heavy equipment and truck operation, support services, and painting. There is no mandatory education requirement for these jobs; however, there is an expectation that people at this level of responsibility would have a minimum Grade 10 education (Carnew and Associates, 1998). A Class 5 driver's licence would generally be required as well.

Heavy equipment operators and truck drivers may require a complete set of basic safety certificates as well as TDG. Heavy equipment operators may additionally require Industrial ATV training, Chainsaw Safety, and a Traffic Control ticket (Carnew and Associates, 1998). Tank and vacuum truck drivers typically need a Class 1 motor vehicle licence with airbrakes endorsement. Previous on-the-job experience operating heavy equipment and trucks is preferred by most employers.

Field clerks would generally require some previous clerical or secretarial experience, and a basic understanding of oil and gas operations. The safety officer generally requires Standard First Aid and WHMIS, and has a considerable knowledge of WCB laws and regulations. The oral history specialist has no formal training requirements, but would typically have an intimate knowledge of local history, special areas, and archaeological information.

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[18] Industry standard course developed by Petroleum Industry Training Service (PITS) for rig managers and drill site supervisors. Certification is valid for 2 years.

3.3.2.3 Advanced Positions

Advanced positions in facility construction are primarily in the trades and entail a high level of proficiency and experience. Journeyman level certification is usually required for tradespeople employed with contract construction companies. Certification in most trades is gained through 3 or more years of combined classroom training and work as an apprentice. The minimum education requirement for most apprenticeship programs is Grade 10 (HRDC, 1997). In some cases, extensive experience may suffice for employment as concrete finishers and steel and ironworkers at a facility construction site (Kissuk, 1998).

Surveying and foreman positions usually require a high school diploma at the very minimum. Surveyors will typically have a technical diploma or post-secondary degree in disciplines such as geomatics or survey engineering and be registered as a Canada Land Surveyor (HRDC, 1997). Construction foremen have demonstrated experience in the trades and the ability to supervise staff and subcontractors. They will usually be certified and have extensive work experience in a particular trade and may have additional supervisory and business course work (HRDC, 1997).

3.3.3 Gas Production

Gas processing facilities are highly automated and require very few people to operate and maintain them. The jobs that are created are fairly technical in nature and require higher levels of education and training than those needed for most seismic, drilling, and facility construction work.

3.3.3.1 Entry-level Positions

The only entry-level position in gas processing facilities is that of junior operator. There are no mandatory education requirements for this type of work, but a person would generally need a solid academic background to perform adequately on the job. The completion of high school and coursework in math, physics, and chemistry would provide the necessary skills (AECD, 1997). A Class 5 driver's licence would also be required.

Junior operators typically require basic safety certificates, as well as an understanding of gas field operations. They are usually trained on-the-job under the direction of unit operators. Gas plants may additionally require their operators to obtain Power Engineering[19] certification.

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[19] Power Engineering certification in Alberta is obtained through the Alberta Boiler Safety Association. There are four levels of certification, 1st Class being the most advanced. Most certificate programs require a high-school diploma with course work in physics, math, and science.

3.3.3.2 Intermediate Positions

Intermediate positions in processing facilities include the unit and gas field production operators. Their basic qualifications are on-the-job experience. Employees start out in helper or junior operator positions and advance after sufficient work experience and additional training provided by the company or other sources (AECD, 1997). Their education requirements are generally the same as junior operators, but they may also take specific training for gas field operations, such as a Gas Field Operator[20] program.

Unit and gas field production operators would typically require basic safety certificates, and may also need to obtain Power Engineering certification.

3.3.3.3 Advanced Positions

The operation of gas processing facilities require personnel in several advanced positions, including lead operators, plant foremen, millwrights, and instrument mechanics. Again, there is no mandatory education requirement for plant operation workers, but a minimum Grade 10 level is preferred. Millwrights and instrument mechanics require journeyman certification, usually gained through three or more years of combined classroom training and apprenticeship work.

Lead operators and plant foreman usually require considerable on-the-job experience. Their basic training is similar to unit and gas production operators. Plant foreman may have additional coursework or experience in business and administration.

3.4 The Working "Culture"

The upstream oil and gas sector presents a unique and challenging work context for its employees. Employee retention and advancement are heavily influenced by individuals' abilities to adapt to the demands of mobility, seasonal employment, and the physical and emotional stress associated with oil and gas work. These issues are briefly discussed in the sections that follow.

3.4.1 Mobility and Rotational Employment

Seismic exploration and drilling activities can create significant employment opportunities in an area over the short-term. Seismic contractors may operate in a region for several years if the amount of available geophysical work is sufficient. Drilling contractors may be involved in developing a series of wells over a similar timeframe. Inevitably, an area that undergoes exploration in the early years will be either produced or abandoned for lack of economic incentive. Drilling and seismic firms will relocate elsewhere, initiating a new cycle of exploration and development.

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[20] Gas Field Operator programs are offered at various community colleges and academic institutions in Alberta and northern BC. They are typically 6-7 months in duration, and require a high school diploma with course work in physics, math, and science.

Seismic activities are particularly transient in nature. Geophysical contracting firms may operate in one region for one or more seasons; however, they will likely be awarded contracts in other areas throughout this duration. Crews must be willing to relocate on an on-going basis. Typically, crews move around western Canada, but they may also work internationally. Employment in drilling is considerably more localized and stable; workers can generally remain within the same region for the duration of an exploration program. The construction of facilities will keep workers in a specific location as well, although only for a short period of time. The actual production of gas comprises the only upstream activity with long-term residency in one area.

Many companies adopt rotational employment programs to allow workers to remain in their own communities rather than having to relocate. Workers are transported from the job site to the nearest major centre, where arrangements are made for travel back to their home communities. Rotational employment is widely regarded as an effective measure to minimize disruptions to workers' families and lifestyle. Many seismic companies operate on a 28-day in/7-day out rotational schedule (DPA Group, 1987). Drilling workers may be on a shorter rotation.

While rotational employment programs are intended to minimize negative impacts on workers and their families, they can not preempt the considerable adjustments that inevitably accompany work in oil and gas. Employees must be willing to spend long periods of time away from home, and families must be able to cope with the absence of that member. This may imply the alteration of organizational, child care, domestic and money management routines within the family unit (DPA Group, 1987). Documented effects of rotational employment have included increased alcoholism for workers and spouses, discipline problems with children, and marital infidelities. It is felt that support networks and the use of coping techniques within families may help to facilitate the necessary adjustment to the frequent absence of a member.

3.4.2 Seasonal Employment and Advancement

Oil and gas work can be highly seasonal in the North, operating primarily in the colder months when remote areas can be accessed via winter roads. Workers may only be employed for parts of the year, particularly workers involved in seismic. In areas where there is a significant amount of exploration activity, there may be sufficient work available to allow individuals to maintain consistent employment with firms. However, in regions of the North where the work may be more sporadic, employees must be able to adapt to the financial constraints of seasonal employment. This may pose significant challenges to the management of personal and family finances.

The issue of seasonal employment is particularly relevant to an individual's potential to advance and succeed in the oil and gas industry. In the past, Northerners have experienced difficulties gaining sufficient seasonal work experience to advance to positions of greater responsibility (DPA, 1986). Typically, it takes several seasons to gain a year's experience, and several years of experience to qualify for promotion. Unless Northerners are willing to work year-round and relocate as necessary to other regions, their southern counterparts can accumulate experience three or four times faster (DPA, 1986). In these circumstances, Northerners are unlikely to progress to senior positions, creating a "bottleneck" in the lower ranks of employment that compromises the recruitment of other individuals. A commitment to year-round rotational employment will significantly improve an individual's long-term outlook in the industry.

3.4.2 Drug and Alcohol Policies

In keeping with its objectives to optimize safety and productivity for its workers, the oil and gas industry is moving towards a zero-tolerance alcohol and drug policy. In particularly dangerous operations such as drilling rig work, the risks associated with substance abuse are perceived to be too high. One worker may compromise the safety of many others if he or she can not perform adequately on the job. Alcohol and drugs are accordingly forbidden on the work site and in the camps. Employees who violate these rules are often "black balled" from the industry permanently. Some seismic and drilling contractors have instituted mandatory pre-employment drug and alcohol testing in an effort to avoid potential difficulties from the outset. Individuals who hope to advance in the industry must be able to cope with drug and alcohol abstinence for long periods of time.

3.4.3 Physical and Emotional Stress

The physical component of work in oil and gas can range from minimal to significant. Seismic and drilling exploration work typically resides on the upper end of the spectrum. The outdoor nature of the work potentially exposes employees to extreme cold, wet, and windy conditions. Heavy equipment, such as cables and recording equipment, must be lifted and carried. Rig workers must contend with the dangers of operating extremely powerful and heavy machinery. In particular, it is the helper and junior rig positions that are the most physically demanding. Supervisory positions, truck drivers, and camp support workers have significantly fewer physical demands placed upon them. Operators in processing facilities spend the majority of their time indoors at automated controls, performing very little physical labour.

Working hours and living conditions may also pose a physical and emotional stress to workers. Crew members on drilling and service rigs routinely perform 12-hour shifts in rotation to keep the rig in operation 24 hours a day (AECD, 1998). Many workers remain on-call throughout the day, in addition to working long shifts (Bott, 1993). Employees are accommodated in mobile housing units, where they must live in close quarters with many people. The ability to peacefully co-exist with fellow workers, deal with the stresses of homesickness and isolation, and maintain a positive attitude is essential to a worker's enjoyment of and success in oil and gas work.

4.0 EDUCATION AND TRAINING LEVELS IN SOUTHEAST YUKON

It is apparent that a minimum level of training and education must exist in a community before residents can access employment in oil and gas to any significant degree. A baseline of information on local human resources is essential to determining what pre-requisites people can already fulfill and where training may be needed to overcome deficiencies. This data may also serve to facilitate the employment process itself, as supervisors from southern firms have historically encountered difficulties in recruiting local individuals without any knowledge of potential candidates and their skill base (DPA Group, 1986).

The following sections provide an overview of education and training levels in the southeast Yukon. It is not the intention here to characterize the labour force of the region; there is sufficient statistical data available for such purposes. Rather, it is meant to provide a "snapshot" of the types of people who aspire to train and work in oil and gas, and the education, training, and employment backgrounds they may bring to this new work context. Using the results of a human resources inventory conducted in the area, the potential oil and gas labour force of the southeast Yukon is described.

4.1 Results of Human Resources Inventory

In order to obtain the necessary baseline of information on the local labour pool, an oil and gas questionnaire (see Appendix D) was circulated in the communities of the southeast Yukon in the fall of 1998. The questionnaire was targeted at those individuals with a specific interest in employment in oil and gas, as it was felt that the needs assessment ought to be informed by the responses of those who would likely receive the training. In essence, a "self selecting" study group resulted.

A total of 110 people responded to the oil and gas questionnaire. It was designed to solicit information on basic vital statistics, work experience, education, certification, and interest in training for oil and gas employment. The results are discussed in the sections that follow.

4.1.1 Basic Demographics

The survey group were asked to indicate their gender, age, whether they were of First Nations ancestry, and employment status. The approximate ratio of male to female participants was 2.5:1. Please refer to Table 4.1 for the results.

Table 4.1 Gender Distribution of Survey Group

Gender	# Persons
Male	77
Female	33
TOTAL	110

The ratio of First Nations to non-First Nations participants was also about 2.5:1. The vast majority of First Nations respondents were members of the Liard First Nation, including several who reside in Lower Post and Good Hope Lake, BC. The results are shown in Table 4.2.

Table 4.2 Ancestry of Respondents

Ancestry	# Persons
First Nations	77
Non-First Nations	33
TOTAL	110

Almost two-thirds of people who participated in the survey indicated they were unemployed at the time. Please refer to Table 4.3.

Table 4.3 Employment Status of Respondents

Employment Status	# Persons
Unemployed	65
Employed	45
TOTAL	110

The age of nearly half of the participants was between 25-34 years. The second most common age group was 35-44 years of age. There were relatively few participants over 44 years of age. Please refer to Table 4.4 for results.

Table 4.4 Age Distribution of Survey Group

Age Group	# Persons
15-24	20
25-34	45
35-44	33
45-54	12
TOTAL	110

4.1.2 Education Levels

Survey participants were asked to indicate the highest grade they had completed, and describe any upgrading[21] and job training[22] programs they had participated in.

Almost half of the 110 respondents had a Grade 10/11 education. About one-fifth had completed their studies up to the Grade 8/9 level; a similar proportion had received a high school diploma. Very few people had post-secondary accreditation. Several participants did not specify their last completed grade. The results are shown in Table 4.5.

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[21] This refers to courses of study that equip people with the minimum qualifications needed to gain employment in a particular field.

[22] Academic upgrading in the Yukon includes Developmental Studies, Adult Basic Education, and College Preparation programs, as well as the General Education Development (GED) test.

Table 4.5 Education Levels of Respondents

Education	# Persons
Grades 6/7	3
Grades 8/9	24
Grades 10/11	48
High school diploma	22
Post-secondary degree	2
Did not specify	10
TOTAL	110

A total of 42 people had taken upgrading of some description. Nearly half of the "upgraders" had received a formal education up to the Grade 11/12 level, and virtually all of the remainder were at a Grade 8/9 level or had not specified their last grade completed. Several high school graduates had also taken upgrading. Please refer to Table 4.6.

Table 4.6 Respondents with Upgrading

Education	# Persons with Upgrading
Grades 6/7	-
Grades 8/9	9
Grades 10/11	24[23]
High school diploma	2
Post-secondary degree	-
Did not specify	7[24]
TOTAL	42

48 of the 110 people surveyed had taken job training programs. The majority of those who received training had a Grade 11/12 formal education. Respondents at the Grade 8/9 level had the second highest participation in job training programs, followed by high school graduates. The results are displayed in Table 4.7.

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[23] Includes one General Education Development (GED) certificate.

[24] Includes five General Education Development (GED) certificates.

Table 4.7 Respondents with Job Training

Education	# Persons with Job Training
Grades 6/7	1
Grades 8/9	12
Grades 10/11	20
High school diploma	10
Post-secondary degree	-
Did not specify	5
TOTAL	48

The job training programs described in the completed questionnaires ranged from short work practicums to pre-apprenticeship trades programs lasting a year or more. Eleven fields of study were devised to categorize these programs. The highest participation rate – about one third of the survey group – was in forestry-related training. The construction trades and social work ranked second and third. Home care/nursing had the fourth highest participation, while secretarial training, mechanics, and surveying ranked fifth. Formal training in cooking, mining, and heavy equipment operation ranked sixth in terms of participation. Literacy and language instruction training were the least common. The results are displayed in Table 4.8.

Table 4.8 Job Training Previously Taken by Participants

Field of Study	# Persons
Forestry[25]	16
Construction trades[26]	9
Social work	6
Nursing/home care/ambulance	4
Administration/secretarial	3
Mechanical trades[27]	3
Surveying[28]	3
Cooking	2
Mining	2
Heavy equipment operation	2
Literacy and language	1

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[25] Training includes the Forestry Worker program at Northern Lights College in Fort Nelson, the Forestry Measurement/Management program at Nicola Valley Institute of Technology, and a silviculture course provided by Liard First Nation.

[26] Training includes pre-employment carpentry and welding courses at Yukon College, a log building course offered by Liard First Nation, and the Women in Trades and Technology (WITT) course that is offered throughout Canada.

[27] Training includes auto, aircraft, diesel, and heavy duty mechanics programs.

[28] Training indicates a pre-employment surveying course offered jointly by Liard First Nation and Lamerton and Associates Ltd.

4.1.3 Work Experience

Participants in the human resources inventory were asked to provide a brief description of their work history. Categories were then devised in an attempt to organize employment information into occupational skills that might be appropriate for jobs in oil and gas. The five employment categories used were primary industry, construction trades, transport equipment operation and mechanics, surveying, and support services. Specific job sub-categories were then devised to convey more detailed information on the types of work individuals had performed. Work experience that did not conform to these categories was included in the human resources database, but is not discussed in this report.

The most common types of oil and gas-related work experience fell under the category of primary industry, most notably forestry and mining. Over half of the survey group qualified as forestry workers[29]. The positions of firefighter, sawmill labourer, bucker, and treeplanter were the most common. Almost 1 in 3 people had filled mining worker positions either currently or in the past; these included jobs such as drillers, miners, labourers, and shop people. A small proportion of respondents had worked previously in oil and gas in positions such as leasehand, toolpush, and oil and gas well tester. As well, some respondents had occupied supervisory positions in primary industry, including crew boss, rig manager, and sawmill owner/operator. Please refer to Table 4.9 for results.

Table 4.9 Work Experience in Primary Industry

Occupation	# Persons
Forestry and logging worker	56
Mining worker	31
Supervisor	12
Oil and gas worker	12
Mining geologist	1

The second most common type of oil and gas-transferable work experience involved transport equipment operation, mechanics, and heavy construction. Nearly 1 in 3 survey participants had operated heavy equipment on the job. This included a variety of machines related to forestry, mining, and road construction. 1 in 5 of those surveyed indicated previous or current experience as truck drivers. A small group of people had experience in entry-level jobs on road construction projects, such as labourer or flagperson. Mechanical work was somewhat less common, and millwrights were very rare. The results are displayed in Table 4.10.

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[29] The term "worker" is used to designate entry-level, labourer, or intermediate positions.

Table 4.10 Work Experience in Transport Equipment Operation, Mechanics, and Heavy Construction

Occupation	# Persons
Heavy equipment operator	34
Truck driver	22
Public works labourer	13
Mechanic	6
Millwright	1

The construction trades were the third most common oil and gas-related field that people had worked in. Nearly half of the 110 survey respondents had experience working as trades helpers and labourers, particularly in carpentry. Only a small proportion had worked as apprentice or freelance carpenters. Very few people indicated they had worked as plumbers or welders. Refer to Table 4.11 for results.

Table 4.11 Work Experience in the Construction Trades

Occupation	# Persons
Trades helper and labourer	48
Carpenter[30]	8
Plumber	3
Welder	1

The fourth most common types of work experience were those with transferability to jobs that play supporting roles in upstream oil and gas. These include hospitality providers, clerical support, and First Aid personnel. About 1 in 10 respondents had work experience as kitchen helpers, and similar number indicated previous employment as cooks. Housekeeping and janitorial work followed by a small margin, as did employment in clerk or secretarial positions. A small group of people had experience in administrative positions, typically for First Nations, government, and private industry. A small number had work experience as First Aid or ambulance attendants. The results are displayed in Table 4.12.

Table 4.12 Work Experience in Support Services

Occupation	# Persons
Kitchen helper	12
Cook	11
Janitor/housekeeper	9
Clerk/secretary	9
Administrator	6
First aid/ambulance attendant	2

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[30] This designation does not imply that a person has formal trade certification in carpentry. No participant indicated they had Journeyman certification in any trade.

The least common types of work experience with transferability to oil and gas were in the applied sciences, specifically surveying and engineering. 1 in 5 questionnaire respondents had worked as surveyor's helpers and assistants. Typical positions included slasher, rodman, and chainman. Only a handful of people had conducted extensive surveying work themselves, or had been employed as engineers. Please refer to Table 4.13 for results.

Table 4.13 Work Experience in Surveying and Engineering

Occupation	# Persons
Surveyor helpers and assistants	22
Surveyor	2
Engineer	1

4.1.4 Certificates

The questionnaire asked respondents to list what certificates they held and the year they received training. Training dates were then cross-referenced with information provided by the certification bodies to ensure that only valid tickets were accounted for. The different types of certification were organized into three categories relating to entry-level employment in oil and gas: training that is considered a basic requirement; training that is needed for specific jobs; and training that is not necessarily required but may increase a candidate's chances of employment.

In the categories of basic and job-specific training, a significant number of people held certificates. Almost half of the survey group had a current Standard First Aid ticket, although only 1 in 5 had a valid CPR. A considerable number of people had taken a Chainsaw Safety course and WHMIS training. A small number of respondents indicated that they had H2S Alive certification, and even fewer had TDG tickets. None of those surveyed had taken any previous ATV training. Please refer to Table 4.14 for results.

Table 4.14 Basic and Job-Specific Certificates

Certificate/Course	# Persons
BASIC	
Standard First Aid	45
CPR	24
H2S Alive	10
JOB-SPECIFIC	
TDG	4
WHMIS	40
ATV Safety	0
Chainsaw Safety	41

Many participants had taken other training that is non-essential to entry-level oil and gas jobs, but may help facilitate employment. The most common were bear awareness training and radio operator's licences. A small group of people had completed courses on safe rigging and hoisting; others had taken short-term training in heavy equipment operation. Courses in camp cooking and formal chef's training had been completed by several participants. Defensive driving courses were also indicated by some. Traffic Control[31] certificates and advanced oil and gas training were relatively uncommon. Formal truck driving and diesel mechanic certification were indicated by one individual each. The results are displayed in Table 4.15.

Table 4.15 Other Certificates

Certificates/Courses	# Persons
OTHER	
Bear awareness	17
Radio operator licence	15
Rigging/hoisting	8
Heavy equipment operator	8
Camp cook/chef	5
Defensive driving	5
Traffic control	4
Advanced oil & gas	2
Diesel mechanic	1
Truck driver	1

Of the 110 participants in the survey, about 2 in 3 people had motor vehicle licences and almost 1 in 3 had an endorsement to operate airbrakes. The vast majority of licence holders had a Class 5 designation, and the remainder of licences were primarily Class 1. Class 2, 3, and 4 licences were relatively uncommon. About 2 out of 3 people with airbrakes endorsements had Class 5 licences. The remainder were primarily Class 1 drivers or did not have any licence at the time. Please refer to Table 4.16 for results.

Table 4.16 Motor Vehicle Licences and Airbrakes Endorsement

Licence	Total # Respondents	# Respondents with Airbrakes
Class 5	68	18
Class 4	1	0
Class 3	2	2
Class 2	1	1
Class 1	6	5
None	32	4
TOTAL	110	30

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[31] A course offered by Yukon College developed to teach proper highway traffic control procedures.

4.1.5 Interest in Training for Oil and Gas

The last section of the questionnaire solicited feedback on people's interest in training for oil and gas employment. Respondents were asked how interested they were in training, and what their preferred timelines, delivery methods, and locations were. A significant proportion of the survey group indicated they were "very interested" in both basic and advanced training. The remainder were "somewhat interested". The results are displayed in Table 4.17.

Table 4.17 Interest in Basic and Advanced Training

Basic Training			Advanced Training		
Very	Somewhat	Not	Very	Somewhat	Not
87	23	0	80	30	0

The length of time people indicated they were willing to train for corroborated the previous findings. Almost half of the survey group selected "more than one year" as the maximum amount of time they would train for. 1 in 4 respondents indicated they would train for a period of 5-16 weeks, and a slightly lesser number chose 1 year as the maximum. Please refer to Table 4.18 for results.

Table 4.18 Maximum Period of Time Willing to Train for

Time	# Persons
1-4 weeks	10
5-16 weeks	24
1 year	21
More than 1 year	48

The vast majority of respondents indicated a preference for full-time Monday to Friday course delivery. Evening and weekend courses were significantly less popular, and distance learning was the least preferred delivery option. Please see Table 4.19 for results.

Table 4.19 Preferred Delivery Methods

Delivery Method	# Persons
Full-time weekdays	91
Evening	30
Weekend	29
Distance learning	23

The questionnaire provided ten categories of work from which people could select the jobs they would be interested in training for. Heavy equipment operation and driving were the most frequently selected jobs, followed closely by drilling crew work. About 1 in 3 of those surveyed expressed an interest in line cutting, labourer, and surveying positions. About 1 in 4 respondents indicated a preference for First Aid and safety officer work. Slightly less popular were cooking and camp support positions. The results are displayed in Table 4.20.

Table 4.20 Types of Jobs Willing to Train for

Job Type	# Persons
Heavy equipment	57
Driving	50
Drilling crew	49
Slashing/cutting	41
Surveying	39
Labour	37
First Aid	28
Safety inspections	25
Cooking	23
Support/administration	21

Only 5 of the 110 people who filled out the questionnaire indicated they would not be willing to travel outside the southeast Yukon to receive training. The 105 people that were willing chose their preferred locations from a list of cities that have training capacity. Whitehorse and Calgary were selected by the majority of participants, followed closely by Edmonton. Fort Nelson and Fort St. John were chosen less frequently. Prince George was the least preferred location. The results are displayed in Table 4.21.

Table 4.21 Preferred Locations for Training

Preferred Location	# Persons
Whitehorse	79
Calgary	79
Edmonton	78
Fort St. John	66
Fort Nelson	62
Prince George	61

4.2 Summary of Results

The majority of respondents to the human resources survey were male First Nations between 25 and 44 years of age. About 1 in 3 of those who participated were women and/or non-First Nations. Many individuals were unemployed at the time. A Grade 10/11 level of education was predominant, followed by Grade 8/9 and high school completion. Almost half of those with Grade 10/11 had also taken some form of upgrading. 48 individuals had taken job training of some description; the majority were in forestry, construction trades, and social work. Most job training was in short-term pre-employment programs. No individuals held formal certification in any trade, and very few held formal diplomas or certificates in those or any other fields.

The most common occupations indicated by respondents included forestry and logging worker, trades helper and labourer, and heavy equipment operator. A substantial number had also worked in the mining industry, as truck drivers, or as surveyor helpers. Significantly fewer individuals had worked in senior, supervisory, or professional positions in primary industry. This was consistent with the trades, in which no individuals indicated they had journeyman certification. Carpentry was the most common trade in which people had worked in more skilled positions, followed by mechanics, plumbing, and welding. About 1 in 10 people indicated they had work experience in oil and gas. The majority of work experience in support services was in kitchen helper positions, cooking, housekeeping, and janitorial work. There were relatively few individuals with administrative experience.

A large number of participants had certification in Standard First Aid, WHMIS, and Chainsaw Safety. Very few had valid tickets for H2S Alive or TDG, and no one had taken ATV Safety training. Bear awareness courses, radio operator's licences, safe rigging and hoisting courses, and heavy equipment orientation are examples of other training individuals had taken. More than 2 out of 3 survey participants had motor vehicle licences, and almost 1 in 3 had airbrakes endorsements. The majority of licences were Class 5; they were relatively few Class 1, 2, 3, or 4 designations.

Survey respondents expressed a high level of interest in training for oil and gas employment, both in the short and long-term. Almost half of the group indicated that they would be willing to train for more than 1 year. The vast majority showed a preference for full-time weekday course delivery. The most common occupations that people expressed an interest in training for were heavy equipment operation, driving, drilling crew work, and slashing/cutting. Cooking and administrative support were the least preferred. Almost all respondents indicated a willingness to travel to receive training, with the most popular destinations being Whitehorse, Calgary, and Edmonton.

5.0 TRAINING NEEDS OF SOUTHEAST YUKON RESIDENTS

In considering the expectations of the oil and gas industry for pre-employment qualifications and the existing levels of skills and training in the southeast Yukon region, it becomes apparent that a number of needs must be addressed before the local workforce is fully prepared for employment. The following section discusses what skills and training local residents may require in order to access employment in both the short and long-term.

5.1 Short-term Needs

Oil and gas employment in the short-term for the Liard region will be created by seismic exploration and drilling activity. It is expected that the majority of job opportunities in seismic will be at the entry-level, as local residents do not have the appropriate experience to assume intermediate and advanced positions. Greater opportunities for intermediate employment may occur during the drilling phase, as local residents have demonstrated appropriate experience for some of the available positions. The following sections briefly examine the anticipated demand for qualified individuals, and discuss the training that may be needed to meet these demands.

5.1.1 Projected Activity and Labour Demand

According to the Department of Economic Development's current implementation plan for the southeast Yukon, the projected schedule for activity will entail one or two seismic surveys from 1999 to 2001 inclusively, in addition to one drilling program in 2001. Please refer to Table 5.1.

Table 5.1 Short-term Oil and Gas Activity

	1999	2000	2001
# of seismic surveys	1	2	2
# of wells drilled	0	0	1

As the scale of short-term activity is relatively small, estimates at labour demand have been derived using average crew sizes for drilling and seismic operations. A total of 66 workers may be required to conduct seismic exploration activities from 1999 to 2001. As many employees will likely work subsequent seasons or years, demand effectively translates into a need for 38 "new hires" or recruits. About 40 workers may be employed for drilling purposes in 2001, and all of these can be considered new recruits. Please refer to Table 5.2.

The figures presented suggest that approximately 78 individuals will assume oil and gas positions during the short-term. This does not necessarily imply that they will require extensive training to do so. Depending upon the requirements of particular jobs and the degree to which these can be fulfilled with present skills and experience, training needs may vary widely for this group.

Table 5.2 Short-term Labour Demand

	Total Labour Demand (persons)		New Recruits (persons)	
	Seismic[32]	*Drilling*[33]	*Seismic*[34]	*Drilling*
1999	18	0	18	0
2000	24	0	12	0
2001	24	40	8	40
TOTAL	66	40	38	40

5.1.2 Safety Courses

There are a number of factors to consider in prioritizing the needs for safety training for the seismic and drilling phases of activity. The southeast Yukon is essentially a frontier region in terms of oil and gas employment, and industry may make some concessions in order to fulfill Northern hire obligations. As well, the territorial WCHSB has not established mandatory training requirements as other jurisdictions have. In essence, the training that Yukoners must undertake may not be as regimented as that of more established oil and gas regions. In addition, training in areas such as Chainsaw Safety, ATV Safety, and defensive driving are fairly specific to only a portion of the jobs available and, accordingly, may not be required by all workers.

The issues of mobility and skills transferability are directly implicated here. A primary objective of training should be to maximize the transferability of skills to a variety of occupations within the oil and gas industry, as well as other sectors of the economy. If workers are to further their on-the-job experience by working outside the southeast Yukon, they must be equipped with the capability to do so. It will ultimately be in the best interests of the southeast

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[32] Labour estimates for seismic surveys are based upon the assumption that residents of the southeast Yukon will fill all available entry-level positions on seismic operations. An average seismic crew of 50 persons employs about 18 people in entry-level jobs. In the years for which 2 geophysical surveys are anticipated, the labour demand is assumed to increase by a factor of 1/3. This is due to the expectation that surveys will not occur simultaneously, allowing about 2/3 of southeast Yukon recruits to fulfill the labour demands for more than one geophysical program.

[33] Labour estimates for drilling operations are based upon the assumption that residents of the southeast Yukon will fill all available entry-level positions, and about 1/3 of the intermediate positions for which previous experience and qualifications have been indicated through the human resources survey. These are primarily heavy equipment operator jobs.

[34] It is assumed that the majority of persons will not gain sufficient work experience to progress to more senior positions, although this will be influenced heavily by their willingness to be mobile. Thus, the majority of new opportunities will be determined by the rate of turn-over in the labour force. The employee retention rate is approximated at 2/3 of individuals hired. In 2000 and 2001, the number of new recruits will thus be 1/3 of the previous year's labour force plus the differential between this figure and the total labour demand.

Yukon to fulfill the mandatory training requirements of other jurisdictions and train its residents to be "well rounded" in their skill base.

The majority of southeast Yukon residents will need to undertake some degree of training in order to satisfy the oil and gas industry's pre-employment safety standards. Extrapolating from the results of the human resources survey, it is estimated that approximately half of the potential labour force will require Standard First Aid and WHMIS courses. H2S Alive will be required by the vast majority, as will CPR (in some cases, only a re-certification will be necessary). TDG and Chainsaw Safety are other courses that will be required by workers on slashing, seismic, and drilling crews. Off-Highway Defensive Driving should also be provided as a general entry-level training component. To prepare for the drilling phase of activity, courses such as General Entry Level Safety (GELS), Confined Spaces Entry, and Rigging and Hoisting will also be useful. The courses suggested are generally transferable to other primary industries in the Yukon, and are consistent with oil and gas pre-employment "packages" in northern BC and Alberta.

5.1.3 Job Readiness

Any pre-employment training provided for prospective oil and gas workers must place additional emphasis on the "personal development" issues that are called into play. These relate to the impacts that employment in oil and gas may have on local residents who are not accustomed to its unique working culture. Prospective employees need to understand fully the demands and expectations of the oil and gas industry. In this way, they can better explore their suitability for and interest in pursuing such work. It has been established that the degree to which individuals can adapt to the stresses of rotational employment, alcohol and drug abstinence, and family adjustments has a direct influence over their ability to retain employment and advance to more senior positions. Accordingly, any training provided must attempt to provide some assistance in meeting these challenges. Of particular importance will be tools to deal with conflict in the household, manage stress in the workplace and home, budget seasonal or sporadic earnings, and take responsibility for personal substance use or abuse. Spouses may need on-going support and assistance during the initial adjustment to the absence of their partner.

5.1.4 Literacy

Literacy is the cornerstone of a basic education and subsequently affects an individual's employment outlook. The lack of a basic education can pose a number of reinforcing barriers throughout the employment process. People who lack fundamental communication and computational skills may have difficulty accessing employment or undertaking on-the-job training to advance. It was the general feeling among industry representatives involved in Northern oil and gas programs in the early 1980s that literacy posed a serious barrier to the success and advancement of local residents (DPA, 1986).

The results of the human resources survey indicated that the majority of the potential labour pool has a Grade 10 or 11 level of education and has likely taken some upgrading. There is a significant proportion of individuals with only a Grade 8 or 9 education. However, the general opinion of local members of the steering committee was that grade level could be a very poor indicator for functional literacy skills. They felt that literacy is and will continue to be a pressing issue in the Liard region.

Although the majority of entry-level occupations in seismic and drilling are labour-intensive, and may not require solid literacy per se, it is imperative that pro-active measures are taken to ensure that this barrier is lessened when time for advancement does come. It is beyond the scope of this project to ascertain what the extent of literacy upgrading required is; however, it is apparent that this issue can not be dealt with in isolation from oil and gas training. An initial literacy assessment could be conducted for trainees to determine what deficiencies may exist in terms of reading, writing, and math. A literacy component could then be used to augment the safety and personal development-related training.

5.2 Long-term Needs

It is difficult to forecast long-term training needs for oil and gas employment at this preliminary stage. The contingencies of economics and exploration findings preclude any predictions as to whether or not gas will actually be produced from new areas in the southeast Yukon. However, some general points can be made with respect to the preparedness of the labour force of the region for the production phase.

The occupations associated with facility construction and oil and gas production are generally more skilled and fewer in number than seismic and drilling opportunities. They include construction tradespeople and production operators for both the plant and in the field. The human resources survey indicated there is the potential for a drastic shortage of qualified individuals to fill these positions. Such a shortage would arise primarily due to the lack of adequate formal education and journeyman certification in the trades.

The issue of basic education comes into play when considering strategies to overcome potential skilled labour shortages. The importance of a high school education as a pre-requisite to advanced employment in oil and gas can not be understated. Both gas plant operator positions and trades work entail considerable technical training. Gas plant operator programs, in particular, require a solid repertoire of senior math and science courses, many of which are not currently accessible through the public education system in the Liard region owing to insufficient demand. Trades apprenticeships typically require about a Grade 10 level of education; thus, there is a greater capacity to provide local students with the basic education needed to engage in this type of training. It was the feeling among local committee members that education tends to be undervalued in the communities of the Liard region, and students do not appreciate the importance of taking the "harder" academic courses.

The issue of skills transferability factor provides further insight into how training resources may be directed to maximize future employment.

Occupations such as gas plant operator have a skill set that is fairly specific to the petroleum industry. In contrast, trades occupations have a broader transferability within various sectors of the economy, including construction and mining. The committee agreed that focusing on training local people to assume jobs in trades created by oil and gas activity would be more practical than training to access petroleum industry-specific occupations with minimal labour demand. This shared view also speaks to a reluctance to prepare individuals to assume highly specialized positions in oil and gas knowing that the industry can be highly unpredictable. In essence, focusing on the trades provides some "insurance" against the risk that oil and gas jobs may not materialize as expected.

Long-term training priorities need not be entirely confined to the vocational realm of opportunities in oil and gas. Professional occupations such as geologists, surveyors, and technologists fill an important niche in the oil and gas industry, as well as other primary industries of economic importance to the Yukon. As post-secondary education is fundamental to these careers, preparation essentially starts in the early high school grades with the pursuit of the necessary courses and pre-requisites. In light of the "remoteness" of future professional opportunities in oil and gas in the Liard region, it may be difficult to convince students that math and sciences are necessary at the high school level. Nonetheless, the industry and educators should endeavor to introduce students to the full range of opportunities, professional and non-professional, that may be available to them in oil and gas.

6.0 TRAINING RESOURCES

In the past, efforts to prepare Northerners to assume employment in oil and gas have been constrained by limited access to training resources and expertise. The primary options for the delivery of training are offering programs in the community using available resources, "importing" Outside capability, or sending residents to larger centres to undertake studies. The advantages and disadvantages of each option must be carefully weighed in terms of their fiscal impact, convenience for participants, and relative chance of success. The following sections explore the capacity of the Yukon and selected Outside resources to conduct oil and gas related training and suggest where limitations may be encountered.

6.1 Capacity of Yukon Institutions

There is a reasonable capacity within the Yukon to provide basic pre-employment training for the oil and gas industry. The territory's established mining and forestry sectors have pre-employment training needs with some similarity to oil and gas; thus, there is existing programming that could be tailored specifically for the new industry. With respect to more specialized oil and gas training, there are severe local limitations. The following sections briefly describe the training resources of the Yukon as they apply to safety training, job readiness skills, industry orientation, and training for advanced occupations.

6.1.1 Safety Training

The following sections provide a brief profile of the Yukon institutions that may be able to provide basic safety training for oil and gas.

6.1.1.1 Yukon College (Watson Lake)

The community Yukon College campus at Watson Lake has the capacity to instruct Red Cross First Aid, WHMIS, and Foodsafe courses. It is currently compiling an eligibility list for instructors who can provide H2S Alive, TDG, and WHMIS training. Typically, it will contract the services of instructors from the Ayamdigut campus to deliver courses such as Chainsaw Safety.

6.1.1.2 Yukon College

The main Yukon College campus in Whitehorse has the capacity to deliver TDG, WHMIS, H2S Alive, Red Cross First Aid/CPR, Foodsafe, and Chainsaw Safety courses. Many of these are offered on a regular basis in Whitehorse. In addition to basic safety elements, there are additional courses that may have relevance or transferability to oil and gas work, including a Rigging and Hoisting[35] course,

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[35] Developed in conjunction with WCHSB regulations to provide basic training for safe rigging and hoisting of heavy loads in an industrial setting. Certification is through Yukon College and is valid indefinitely.

Heavy Equipment orientation, Machinery Maintenance, Air Brakes, and Confined Spaces Entry[36].

6.1.1.3 St. John Ambulance

St. John Ambulance has the capacity to provide a full range of First Aid/CPR courses both in Whitehorse and the communities.

6.1.2 Industry Orientation

There are a limited number of Yukon resources available to deliver an industry orientation for prospective oil and gas employees. The past 15 years of relative inactivity and lacking infrastructure in the territory have restricted the number of individuals who are qualified to provide this expertise. However, Yukon College currently has two such resources and others with experience in the industry, including several residents of the Liard region, were identified throughout the course of the project.

6.1.3 Job Readiness

The Yukon has a full capacity to provide a complete range of job readiness-type programming. The Yukon has an extensive network of professionals who deliver workshops and training in the job readiness/life skills areas. Many of these are private contractors who may have affiliations with organizations such as Yukon College, Mediation Yukon, Family Services Association, and the Skookum Jim Friendship Centre.

6.1.4 Training for Advanced Occupations

There are very few advanced oil and gas employment opportunities for Yukoners available at present. Correspondingly, there is no capacity in the territory to deliver the requisite training. Occupations that are highly specific to the petroleum industry, such as gas plant operators, would have to be trained for outside of the territory. It is unlikely that the scale of oil and gas development in the southeast Yukon will ever be sufficient to warrant local programming for specialized oil and gas occupations, especially in light of their minimal labour demand.

The trades occupations associated with the facility construction phase of oil and gas do provide a greater opportunity for training in the Yukon. At present, the Advanced Education Branch administers apprenticeship programs in about 40 trades (Human Resources Development Canada, 1997). These include the following: millwright, carpenter, heavy equipment mechanic, painter, cement mason, steamfitter-pipefitter, electrician, welder, and insulator. Most apprenticeships entail 3 to 4 years of classroom training and on-the-job experience, leading to interprovincial Red Seal certification in the trade chosen.

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[36] Developed in conjunction with WCHSB regulations to teach techniques for safe entry and rescue techniques in confined spaces. Certification is through Yukon College and is valid indefinitely.

Most of the classroom portion of apprenticeship programs must be attended at Outside institutions. However, Yukon College currently has pre-employment programs in the fields of heavy equipment mechanics, carpentry, and construction/industrial electricity. They are generally 10 months in length, and provide students with advanced standing in programs outside the territory, where they can complete their studies. As well, the College has a 10 month Surveying Technician program available.

6.1.4 Training Limitations

There is sufficient capacity within the Yukon to deliver most of the basic safety training for employment in oil and gas, as many of these courses are already needed by other industrial employers in the territory. There are deficiencies in the areas of ATV training and defensive driving, however. No "official" courses are delivered in the territory for either skill, suggesting this training will have to be accessed from Outside.

It is also important to consider the trend for oil and gas companies to require industry "standard" training, such as the courses that are developed and certified by PITS. These courses are designed to give workers and companies "cross jurisdictional" coverage in their activities. While the Yukon may have the capacity to deliver equivalent courses to meet relevant worker standards in the territory, these may not be sufficient for employment in other jurisdictions. As much as possible, the Yukon will need to follow the lead of established oil and gas regions with regard to making decisions about training.

Training for the majority of advanced occupations in the industry will have to be conducted outside the territory at post-secondary institutions. The territory has reasonably good apprenticeship coverage for most of the trades required in oil and gas, with the exception of instrument mechanic. However, the formal classroom study required as part of most apprenticeship training can not be undertaken at Yukon institutions.

The educational pre-requisites for a professional or technical occupation in oil and gas must also be pursued outside of the territory. Yukon College offers general Arts and Sciences courses up to the second post-secondary year level. Many of these have transferability to institutions outside, where they can be counted towards the completion of formal university or college degrees. A more immediate limitation currently applies to students of the southeast Yukon, however. The local high school does not offer the full range of senior high school math and sciences that are generally required for admission into post-secondary technical or scientific studies. Students who wish to pursue this avenue of study would have to complete their high school education outside of their home community.

6.2 Capacity of Outside Institutions

The prevalence of the oil and gas industry has created an extensive network of training resources throughout northern British Columbia and Alberta. There are numerous sources for basic and advanced safety courses, technical training, and post-secondary education in these provinces. While a generic post-secondary technical or university education can be accessed throughout Canada, the educational institutions of Alberta have the advantage of collaborating with industry to develop "tailor-made" programming. There are few, if any, limitations with respect to oil and gas training in this province. The following sections focus on what is available specifically in terms of safety training and preparation for advanced occupations.

6.2.1 Safety Training

The following sections provide a brief profile of selected institutions in northern British Columbia and Alberta that are able to provide both basic and advanced safety training.

6.2.1.1 Northern Lights College

Northern Lights College in Fort Nelson and Fort St. John have developed a wide range of programming to meet the needs of the local oil and gas industry. Courses are generally offered through the Continuing Education divisions. Both campuses regularly offer Occupational[37] and Standard First Aid, WHMIS, TDG, H2S Alive, Chainsaw Safety and Maintenance, and Hand Fallers and Buckers[38] courses. The Fort St. John campus also offers Industrial ATV Operators, ATV Instructor[39], PITS Chainsaw Safety[40], Seismic Blaster's Safety, and Well Service Blowout Prevention courses. Driving courses are offered in conjunction with the Dawson Creek campus, and include PITS-certified General Oilfield Driver Improvement (GODI)[41], Light Duty Vehicles Driver Improvement[42], and Oilfield Hauler's[43] courses.

6.2.1.2 Blue Star First Aid and Safety Training (Fort St. John)

Blue Star Training offers a comprehensive range of basic pre-employment safety training. Courses include: Standard and Occupational First Aid, H2S Alive, Industrial ATV Operators, WHMIS, TDG, and Off-Highway Defensive Driving.

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[37] A first aid course developed by the British Columbia WCHSB that is generally equivalent to Standard First Aid. Certificates are valid for 2 years.

[38] A safety course designed by the British Columbia WCHSB that provides comprehensive chainsaw training. Tickets are valid indefinitely, and generally

[39] Provides participants with Canada Safety Council certification as ATV Rider Course instructors.

[40] Chainsaw safety training developed by PITS in conjunction with the Canadian Association of Geophysical Contractors (CAGC). Certification is valid indefinitely.

[41] An industry standard course designed for oilfield truck drivers operating vehicles in excess of 4500 kg. Certification is through PITS and is valid indefinitely.

[42] An industry standard course for personnel who drive light duty trucks to and from the field. Certification is through PITS and is valid indefinitely.

[43] An industry standard course designed for heavy haulers in the oil and gas industry. Certification is through PITS and is valid indefinitely.

They also feature a 5-day Entry Level Industrial Safety Program (ELIS) that combines General Entry Level Safety (GELS)[44], H2S Alive, WHMIS, TDG, Occupational First Aid, and Off-Highway Defensive Driving[45]. Other courses offered include GODI and Confined Spaces Entry.

6.2.1.3 Petroleum Industry Training Service (PITS)

PITS is the training "arm" of the oil and gas industry, and is generally considered to be at the forefront of safety training development and delivery. The PITS training facilities at Nisku and Calgary are fully equipped to deliver a full range of pre-employment safety training. Basic safety course offerings include Standard First Aid, H2S Alive, WHMIS, TDG, Off-Highway Defensive Driving, PITS Chainsaw Safety, and GELS. They also offer GODI, Light Duty Vehicles, and Oilfield Haulers courses. PITS has a 5 day Safety Orientation package that includes H2S Alive, Hydrocarbon Gas Hazards and Detection, TDG, WHMIS, Standard First Aid, and Off-Highway Defensive Driving. Advanced safety courses include Well Service Blowout Prevention, Special Oilfield Boilers, and 1st Line Supervisors Blowout Prevention.

6.2.2 Training for Advanced Occupations

Advanced occupations in the upstream oil and gas sector may need specialized training. In some instances, companies will pursue on-the-job training as an appropriate delivery method for employees who demonstrate the necessary qualifications and commitment. In other cases, prospective employees may wish to seek training as a pro-active measure to improve their job prospects. The following sections focus on the institutions that provide technical training related to oil and gas specific occupations. Training in the trades is widely available throughout Canada and is not discussed here.

6.2.2.1 Northern Lights College

Northern Lights College offers several programs related to advanced employment in the oil and gas industry. There is a Power Engineering and Gas Processing program available at the Fort St. John campus that provides participants with the skills and qualifications needed for gas facility operation. The Fort St. John campus also offers a Land Resource Management certificate or diploma program aimed at giving students the technical skills to gain employment with oil and gas companies.

6.2.2.2 Northern Alberta Institute of Technology (NAIT)

The Northern Alberta Institute of Technology (NAIT) in Edmonton offers a number of programs related to advanced oil and gas occupations. These include a two-year Petroleum and Mineral Engineering Technology program with a specialization in petroleum engineering designed for advanced drilling and servicing work. The two-year diploma programs in Electronics Engineering Technology and Mechanical Engineering Technology are considered suitable training for advanced seismic, drilling, or gas processing work. The Power Engineering and Chemical Engineering Technology programs are geared towards gas plant operators.

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[44] An industry standard course intended to teach basic safety practices to new employees in the oil and gas industry. Certification is through PITS and is valid indefinitely.

[45] An industry standard course intended to teach defensive driving practices to oil and gas personnel operating vehicles on off-roads. Certification is through PITS and is valid indefinitely.

6.2.2.3 Southern Alberta Institute of Technology (SAIT)

Southern Alberta Institute of Technology offers similar courses to that of its northern counterpart. These include the Petroleum and Mineral Engineering Technology, Electronics Engineering Technology, Mechanical Engineering Technology, Power Engineering, and Chemical Engineering Technology programs. They also offer programs in Process Operations and Industrial Instrumentation Technology geared towards employment in gas plants.

6.2.2.4 Various Alberta Institutions

A number of community colleges throughout Alberta offer programs to meet the needs of the local oil and gas industry. Power Engineering programs are available at a number of institutions, including Alberta Vocational College in Lac La Biche, Grande Prairie Regional College, Keyano College at Fort McMurray, Lakeland College, Medicine Hat College, Red Deer College, and Fairview College (AECD, 1997). These schools may also offer gas plant operations training by distance education.

Keyano College has a Gas Field Operator certificate program. Lethbridge Community College offers a two year diploma in Electronics Engineering Technology for individuals seeking advanced employment on seismic crews. Lakeland College in Lloydminster offers a Heavy Oil Operations Technician certificate, which prepares graduates to challenge the 4th Class Power Engineering exam.

6.2.3 Distance Courses

Distance education is gaining favour as a convenient delivery method, and oil and gas courses are no exception in this regard. Correspondence safety training is available through PITS for GELS, Off-Highway Defensive Driving, 1st Line Supervisor's Blowout Prevention, and Well Service Blowout Prevention. There are additional distance learning opportunities for individuals interested in instrumentation and gas field operations.

There are distance options available for advanced employment as well. Distance learning opportunities for gas plant operations are available through the following institutions: Alberta Vocational College in Lac La Biche, Grande Prairie Regional College, Keyano College at Fort McMurray, Lakeland College, Medicine Hat College, Red Deer College, and Fairview College. The Open Learning Instructional Systems at SAIT and NAIT have courses in Gas Process Operations, Production Field Operations, and Power Engineering. As well, the first year of the Petroleum Engineering Technology, Chemical Engineering

Technology, and Industrial Instrumentation Technology programs can be taken by correspondence.

6.3 Funding for Training

There are several options open to trainees in the southeast Yukon who wish to receive financial assistance. The Employment Training and Enhancement Program is an initiative funded by the Yukon Territorial Government (YTG) and administered by Yukon College on the advice of the Watson Lake Training Advisory Committee. Under the program, training assistance is provided for residents of the Liard Basin area who wish to retrain, upgrade, and develop their job-related skills. Human Resources Development Canada (HRDC) offers financial assistance to individuals who have had an active Employment Insurance claim in the previous 3 years. Generally, training programs must be a minimum 21 days in length to qualify for YTG and HRDC funding. Liard First Nation also has funding available for members who wish to undertake training. Application forms and information for YTG, HRDC, and Liard First Nation funding can be accessed at the Yukon College campus, Outreach branch, and Liard First Nation office, respectively.

7.0 CONCLUSION AND RECOMMENDATIONS

The upstream sector of the oil and gas industry provides employment opportunities in a wide range of occupations. These include industry-specific jobs, such as drilling rig and seismic workers, as well as more generic "support" occupations, including heavy equipment operation, cooking, and construction. A number of professional occupations are also closely associated with the industry. The early exploration phases of upstream development are fairly labour intensive and can employ large numbers of people. Later phases related to the production of oil and gas are increasingly technical and have a considerably reduced labour requirement. In general, there are greater opportunities for entry-level and intermediate employment in seismic and drilling activities than in facility construction and gas production.

The drilling and seismic labour forces are generally upwardly mobile in nature. Persons who begin in entry-level positions can eventually gain sufficient on-the-job experience to progress to positions of greater responsibility and difficulty. Individuals who commit themselves and can successfully adapt to the stresses of rotational employment, alcohol and drug abstinence, and group living are ideal candidates for retention and promotion. The seasonal nature of oil and gas work and the lack of year-round local opportunities have historically been barriers to advancement for Northerners. It is imperative that Northerners gain experience in other regions if they are to succeed in the long-term in oil and gas.

Safety training for employment in the oil and gas industry endeavors to minimize company liability and maximize efficiency and productivity. Safety standards are developed and upheld by industry associations, governments, and individual companies. For industry-specific occupations in oil and gas activity, the standard safety training requirements are H2S Alive, Standard First Aid/CPR, and WHMIS. Job-specific training includes Chainsaw Safety, TDG, and Industrial ATV Safety, which are required primarily by seismic and drilling workers. Support jobs may require some basic training, in addition to other pre-requisites. As oil and gas workers advance to intermediate and advanced positions, they may be required to take additional training related to well blowout prevention, driving, and boiler operation.

There are generally no mandatory education requirements for industry-specific jobs, but the expectation is that workers in entry-level and intermediate occupations will have Grade 9 and 10 schooling, respectively. Advanced occupations, such as trades work and gas operators, must additionally fulfill the educational pre-requisites for apprenticeship programs and technical training. Professional occupations will generally require post-secondary diplomas or degrees in the applicable field.

The results of the human resources survey indicate that the potential oil and gas labour pool of the southeast Yukon has a reasonable level of basic safety training and work experience in entry-level positions in forestry, mining, and construction. Although the average level of education is Grade 10/11, it is doubtful that this accurately reflects functional literacy skills. Previous short-term job training can be expected from many prospective oil and gas workers, particularly related to forestry and construction. However, there is a serious shortage of qualified journeymen and professionals.

It can be expected that residents of the southeast Yukon will be limited to entry-level employment in the initial years of seismic exploration, due to their inexperience in the industry. There may be more opportunities at the intermediate level during drilling, where heavy equipment operators and various other support staff are required. According to the projected schedule for activity in the southeast Yukon, approximately 78 individuals will be employed for seismic and drilling programs between 1999 and 2001. The majority of this group will require some degree of pre-employment skills and safety upgrading.

Industry pre-employment expectations may be more "flexible" initially in the southeast Yukon, due to a less stringent regulatory regime and the inexperience of the workforce. Job-specific training may also not be required by the entire labour pool, as only a select group of individuals will fulfill these particular positions. However, in the interests of allowing workers to gain experience and advance in an inherently mobile industry, the southeast Yukon would be well advised to provide training that is considered standard in other jurisdictions. It should also equip its workers with skills that are transferable to a variety of jobs within oil and gas, as well as other primary industries in the territory.

The acquisition of safety skills as an initial step to prepare local residents for oil and gas employment is only one component of the equation. The social context in which training and employment is conducted can not be ignored. In the case of the southeast Yukon, trainees will require assistance in coping with demands of a challenging new work context. Issues surrounding rotational employment, adjustments in the family structure and routine, the management of seasonal earnings, and the avoidance of substance use must be addressed if trainees are to ultimately succeed and advance in the industry. Literacy also poses a potential barrier to southeast Yukon residents, and may need to be incorporated into training initiatives.

The long-term outlook for oil and gas employment in the region is difficult to forecast, but several points can be made. The relative merits of training a small number of individuals to access highly specialized positions such as gas plant operators may be outweighed by the limited transferability these jobs will have to other sectors of the local economy, and the questionable likelihood of individuals having the appropriate educational background. If it is agreed that an emphasis should be placed on transferable skills, it may be more beneficial to train individuals for occupations in the trades.

The Yukon has an adequate capacity to provide basic entry-level safety training for the oil and gas industry. Many of the fundamental courses are required by other primary industries already established in the territory. However, some courses that are very specific to the needs of upstream petroleum companies may not be available in the Yukon. Advanced safety training will have to be accessed Outside, along with post-secondary technical or university programs. Apprenticeships for the trades associated with oil and gas are generally available in the Yukon, although classroom portions of training will generally need to be attended outside the territory. Northern British Columbia and Alberta have a wide variety of basic and advanced safety training and technical programs available, as well as some distance learning programs.

While this needs assessment was conducted for the Liard region, its findings provide some insight into what may expected in other communities of the Yukon. Inexperience in the oil and gas industry will not be unique to the labour pool of the southeast Yukon. Rather, it can be assumed that Yukon communities will be on relatively even ground with respect to their familiarity with and exposure to the industry. Accordingly, they are likely to face the same challenges in adjusting to and coping with oil and gas employment. It can also be expected that other communities may exhibit a similar labour profile in terms of participation in fields such as mining, construction, and support services. However, the concentration of the forestry industry in the southeast Yukon and varying degrees of participation in the subsistence economy will be the source of some fundamental discrepancies in the skill sets of regional labour forces in the Yukon. For example, the relatively high levels of certification in skills such as First Aid, Chainsaw Safety, and WHMIS in the southeast Yukon may not encountered in smaller communities with a greater emphasis on traditional subsistence living and less participation in primary industry.

Any initiative to train residents of frontier regions to participate in oil and gas must be fully cognizant of the associated risks. The early stages of petroleum development are highly subject to economic and political constraints, and training may be delivered to prepare residents for jobs that may not materialize as originally expected. Conversely, if training is not delivered at all, a community may find itself unable to participate in oil and gas to any meaningful degree should opportunities arise with little advance notice. In weighing these risks, two important points must be considered. First, basic training for oil and gas exploration work is relatively transferable to other primary industry sectors such as mining and forestry. Should individuals find no local opportunities in oil and gas at the completion of training, they will still be equipped with a skill set that is in demand in other fields. Second, the option remains for trainees to gain oil and gas employment outside of the territory in the event that development does not proceed as anticipated. Ultimately, these individuals will be poised to take on a more significant role when the industry does arrive in their home region.

The following recommendations set out a series of initiatives to be undertaken over the short-term in order to prepare southeast Yukon residents for employment in seismic and drilling. Long-term considerations are difficult to address to a significant degree at this stage. However, some of the more relevant issues are discussed in Chapter 5. For more specific information relating to the short-term training, please refer to Appendix E.

Primary Recommendations:

1. A brief evening information session should be held in early 1999 to introduce residents of the southeast Yukon to training that is planned for the region. Support and information pertaining to funding applications should be provided at this time. Ideally, the recruitment should target a group of approximately 16-20 individuals.

2. As the first component of pre-employment training, an orientation should be offered in early 1999 to familiarize participants with the nature of the oil and gas industry and its potential employment opportunities. This orientation should include an overview of all the phases of industry operation and the nature of rotational employment. Information about the education and training requirements for jobs should also be provided so that people can assess what potential they may have in the industry. In addition to prospective employees, community employment resource persons and high school guidance counselors should be invited to attend.

3. A basic safety training component should be delivered in early 1999. It would include courses in Standard First Aid/CPR, WHMIS, TDG, H2S Alive, Chainsaw Safety, Industrial ATV training, and Off-Highway Defensive Driving. Class sizes would have to remain flexible to accommodate those individuals who already meet some of these requirements. It is assumed that the majority of participants will require H2S Alive, TDG, Industrial ATV training, and Off-Highway Defensive Driving. Class sizes for the other courses may be substantially reduced. As well, some participants may only require re-certification for their First Aid/CPR and may be able to access this through pre-scheduled training in the community. The training could be delivered within a 7-9 day period by either Yukon or Outside resources.

4. In conjunction with industry orientation and safety skills training, a job readiness component should be provided for prospective oil and gas workers. Components of this training should include conflict resolution, anger and stress management, money management, substance abuse prevention, and preparation for mobility.

7. The communities and First Nations of the Liard region should investigate options for incorporating a literacy component into any training for oil and gas employment. An initial literacy assessment at the time of orientation could establish whether such measures may or may not be necessary. Additional advisory support and assistance could be provided for individuals who are uncertain as to whether they should seek upgrading.

Secondary:

8. The southeast Yukon should increase its capacity to deliver industry-specific courses such as H2S Alive, Transportation of Dangerous Goods,

and Industrial ATV courses. A permanent resident in the area with experience in the industry would be an ideal candidate to equip with training skills. This individual could act as a permanent industry training resource in the area.

9. A feedback session with both trainees and representatives of geophysical firms should be held in the winter of 1999 to assess the strengths and weaknesses of the initial training provided. This feedback should seek information on job satisfaction, how many individuals intend to further their industry experience, and what barriers they may have in doing so. This feedback may also pertain to what support the communities of the southeast Yukon could offer to assist workers and their families.

10. The Yukon Worker's Compensation, Health, and Safety Board should explore the development of reciprocity agreements between the Yukon and other jurisdictions in terms of mandatory safety training for oil and gas. The Yukon should seek to clarify their position on the transferability of training that is offered in the Yukon and what additional measures may need to be taken to facilitate the cross-jurisdictional employment of Yukon residents.

11. Assuming that two geophysical surveys are conducted in 2000, a similar training program as that recommended for 1999 should be offered to a group of approximately 12 individuals. It may be subject to revisions evolving from the outcome of the aforementioned feedback session as well as activity and labour projections for that year. In 2001, about 10 local individuals should receive similar training.

12. To prepare for anticipated drilling in 2001, an additional training program should be offered in 2000 to about 40 individuals. This program should contain the same industry orientation and job readiness elements as previous training, as well as H2S Alive, TDG, WHMIS, and Standard First Aid courses. Additional training could be offered in Rigging and Hoisting, Confined Spaces Entry, General Entry Level Safety (GELS), and Airbrakes. As part of preparation for drilling work, driving training may need to be offered to a select group of candidates.

13. A local committee should be organized with the mandate to advise on matters pertaining to oil and gas employment in the southeast Yukon. The committee should investigate options for aiding local individuals in seeking off-seasonal or Outside oil and gas employment. A special training allowance could be allotted to encourage this method of gaining experience. Options should be explored for including "off season" literacy upgrading as a form of training. Individuals who do not wish to work in oil and gas year-round could be funded to attend upgrading during the "off season". Human resources persons in the southeast Yukon could strengthen their communications with recruiting offices and companies in the South to ensure that residents are made aware of potential opportunities Outside.

14. In cooperation with the local high school, an open house should be held for students to introduce them to opportunities in oil and gas. Representatives of the industry could be on hand to speak about the wide range of technical and professional jobs available. Guidance counselors should become well versed in the industry's career options.

15. The communities and First Nations of the Liard region should organize support groups for the families and spouses of workers in oil and gas. A support person should also be on-site during local seismic and drilling programs to assist local individuals in making adjustments to their new workplace.

LIST OF CONTACTS

Alberta Society of Engineering Technologists
Amoco Canada Petroleum
Anderson Exploration
Arctic Construction
Association of Professional Engineers, Geologists & Geophysicists
Beanery Heli-Slashing
Blue Star Training
Canadian Association of Geophysical Contractors
Canadian Association of Oil Well Drilling Contractors
Canadian Association of Petroleum Landmen
Canadian Association of Petroleum Producers
Canadian Society of Exploration Geophysicists
Canadian Society of Petroleum Geologists
Carnew and Associates
Cenalta Well Services
Devon Energy
Energeum
Ensign Drilling
First Nations Employment & Training (FNET) Centre
First Nations Group
Flint Construction Engineering
Golder & Associates Environmental
Indian Oil & Gas Canada
Indian Resources Council
Misku Joint Ventures
Northern Lights College
Petroleum Communication Foundation
Petroleum Industry Training Service
Petroleum Services Association of Canada
Poco Petroleum
Quest Alliance Engineering Construction

Ranger Oil
Southern Alberta Institute of Technology
University of Northern British Columbia
Veritas Seismic
Yukon College

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APPENDIX A: OIL & GAS JOB INDEX

OIL & GAS JOB INDEX

An index of oil and gas occupations has been included to help simplify the identification of potential work opportunities. Occupations are classified in terms of the phase of upstream development they are associated with. To remain consistent with the discussion in Chapter 3, jobs are categorized as entry-level, intermediate, or advanced. The index can be used to cross-reference job titles with the information presented in the report and Appendices B and C.

Seismic Occupations

ENTRY-LEVEL

Bucker
Camp attendant
Cook's helper
Driller helper
Observer helper
Packer
Shooter helper

INTERMEDIATE

Cook
Lead cutter
Line crew boss
Seismic driller
Shooter
Survey helper
Troubleshooter
Vibrator operator

ADVANCED

Party manager
Seismic observer
Staging manager
Survey chief

Drilling Occupations

ENTRY-LEVEL

Bucker
Cook's helper
Floorhand
Gatekeeper
Labourer
Leasehand
Pump operator helper
Slasher/faller
Swamper
Tree planter

INTERMEDIATE

Cook
Derrickhand
Environmental monitor
Heavy equip. operator
Motorhand
Power tong operator
Safety officer
Truck driver
Well loggers/testers

ADVANCED

Driller/operator
Heavy equip. mechanic
Pump equip. operator
Rig manager
Welder

Facility Construction Occupations

ENTRY-LEVEL	INTERMEDIATE	ADVANCED
Electrician's helper	Catskinner	Carpenter
Labourer	Field clerk	Electrician
	Heavy equip. operator	Foreman
	Oral history specialist	Insulator
	Painter	Pipefitter-steamfitter
	Safety person	Plumber
	Tank truck operator	Surveyor
	Vacuum truck operator	

Production Occupations

ENTRY-LEVEL	INTERMEDIATE	ADVANCED
Junior operator	Gas field operator	Senior operator
	Unit operator	Plant foreman
		Instrument mechanic
		Millwright

APPENDIX B: JOB DUTIES

JOB DUTIES

The tables in the following section present the primary job duties for entry-level, intermediate, and advanced occupations in the oil and gas industry. The information is based on a series of occupational profiles developed by the Alberta Learning Information Service (ALIS) of the Government of Alberta. For the purposes of this document, brief descriptions are provided. Readers are encouraged to access more detailed information through the ALIS website at http://www.aecd.gov.ab.ca/occinfo, or to contact the following address:

Career and Labour Market Information
Alberta Advanced Education and Career Development
6th Floor, Sterling Place
9540-106 Street
Edmonton, Alberta, T5K 2V1
Tel: (403) 422-1794
Fax: (403) 422-5319

Entry-level Occupations in Seismic Exploration

Occupation	Job Duties
Bucker	- limb and buck trees felled by the lead cutter - ensure that everything on trail is cut flat to ground - conduct maintenance on saws at night
Camp attendant	- basic housekeeping duties such as laundry, cleaning floors, making beds, etc.
Cook's helper	- helps prepare and serve food
Driller helper	- assist driller prepare boreholes for explosives - carry and maintain equipment - keep logs of drilling activities
Observer helper	- assist observers - haul equipment such as geophones and cables - place and connect recording equipment
Packer	- carry gas, pack, and other equipment - clear trails of debris - mix and refill gas - miscellaneous tasks
Shooter helper	- carry and place explosives - tamp charges - guard an area while shooting is conducted - assist shooters as required

Intermediate Occupations in Seismic Exploration

Occupation	Job Duties
Cook	- plan menus and order supplies - prepare meals - supervise helper
Lead cutter	- fall trees - supervise slashing crew - report on daily activities - coordinate equipment and supplies
Line crew boss	- supervise line crew personnel - drive and maintain trucks that transport personnel and equipment - coordinate boarding and exiting helicopters
Seismic driller	- transport drilling equipment - maintain logs of the drilling activity - load boreholes with explosives
Shooter	- drive and maintain the trucks carrying shooting equipment - place explosives in the boreholes (if not done by drillers) - oversee helpers in laying electrical cables and connecting explosive charges - monitor equipment and inventory explosives - ensure safe handling and storage of explosives
Survey helper	- hold electronic measuring device reflectors - carry equipment - use hipchain - set stations and pickets
Troubleshooter	- fix recording equipment - report to observers
Vibrator operator	- organize the placement of unit - operate and maintain vibrator equipment - handle and adjust controls which position the plate - coordinate activities with seismic observers - drive fuel trucks as required

Advanced Occupations in Seismic Exploration

Occupation	Job Duties
Party manager	- organize seismic crews, equipment, and logistics - arrange for survey locations - ensure safe work procedures - supervise seismic crews and deal with problems
Seismic observer	- operate, maintain and troubleshoot the recording equipment - perform daily and monthly instrument tests - supervise line truck personnel and helpers - ensure the quality of recorded data - document recording operations
Staging manager	- inventory equipment - organize staging sites, personnel, and equipment for heli-portable operations
Survey chief	- operate theodolite, level, electronic measuring device, GPS, etc. - take direction from geophysicist in laying out seismic lines - keep records of field measurements

Entry-level Occupations in Drilling Exploration

Occupation	Job Duties
Bucker	- limb and buck trees felled by the fallers - ensure that everything on trail is cut flat to ground - conduct maintenance on saws at night
Camp attendant	- basic housekeeping duties such as laundry, cleaning floors, making beds, etc.
Cook's helper	- help prepare and serve food
Floorhand	- use tongs to connect and disconnect drill parts as it is going in and out of well hole - catch samples of drill cuttings - assist other crew members - clean and maintain equipment - "housekeep" around the rig
Gatekeeper	- ensure that the site is secure - guard against theft and vandalism - control access from incoming parties
Labourer	- install culverts - construct fences - clean and paint - general maintenance and reclamation work
Leasehand	- load and unload trucks - build fences - assist other crew members - clean equipment and buildings
Pump equipment operator helper	- drive trucks to well site - haul hoses, pumps, and other equipment - help prepare equipment for pumping operations
Slasher/faller	- fall trees - slash right-of-way
Swamper	- assist truck drivers - load and unload trucks
Tree planter	- revegetate the site for reclamation

Intermediate Occupations in Drilling Exploration (1)

Occupation	Job Duties
Cook	- plan menus and order supplies - prepare meals - supervise helper
Coring operator	- choose and deliver the bits used to obtain core samples - direct drillers in core sample operations - package samples for geologist to evaluate
Derrickhand	- guide lengths of pipe into and out of drilling elevators from a platform high above rig floor - steadies pipe while it is connected or disconnected to drilling or casing string - prepare mud reports - assist in training new crew members
Drill stem tester	- drive trucks with testing equipment - assemble and dismantle testing tools - supervise the rig workers who lower the testing tools
Environmental monitor	- ensure that the environmental conditions of drilling permits are followed - keep in contact with First Nation and/or government regulatory agencies
Heavy equipment operator	- operate packers, crawler tractors, backhoes, graders - construct roads, rig site, ditches, bridges - access gravel supplies
Motorhand	- operate and maintain the engines on the rig - circulate drilling fluid - check tongs and spinning chain - ensure emergency shutoff controls are operational - help train new crew members
Mudlogger	- use instruments to identify different characteristics and qualities in drill cuttings - examine mud for traces of oil and gas - analyze gases in drilling mud
Power tong operator	- use hydraulic power tongs to connect casing as it is lowered into well - monitor pressure gauges to ensure that casing joints are connected properly - service and maintenance of equipment - train other crew members
Safety officer	- evaluate work procedures to identify potential hazards and plan to avoid these - advise supervisors and crews about safety standards and regulations - develop health and safety policies and programs

Intermediate Occupations in Drilling Exploration (2)

Occupation	Job Duties
Skidder operator	- drag fallen and bucked trees off the rig site
Truck driver	- drive trucks and maneuver them in tight spaces - follow safety regulations - conduct security checks and vehicle inspections - load and secure cargo
Wireline operator	- drive wireline trucks - assemble the special instruments and tools which are lowered into the well - operate a winch to lower and raise tools

Advanced Occupations in Drilling Exploration

Occupation	Job Duties
Driller/operator	- supervise the drilling crew - maintain and test the BOP equipment - maximize safety and efficiency - train new members
Heavy equipment mechanic	- repair and maintain mobile equipment and machinery - troubleshoot structural, mechanical, or hydraulic systems - routine maintenance work
Pump equipment operator	- use tools to assemble and connect pumping equipment - monitor pumping on a control panel - operate controls - maintain the correct pressure, density, rate, and concentration of chemicals
Rig manager	- coordinate activities of all crews - make arrangements for drilling and servicing at a location - organize setup and dismantling of rigs - ensure safe and smooth operations
Survey chief	- operate theodolite, level, electronic measuring device, GPS, etc. - take direction from geophysicist in laying out seismic lines - keep records of field measurements
Welder	- repair, fabricate, or modify machinery and equipment on the rig site - develop a project plan, follow blueprints and layouts

Entry-level Occupations in Facility Construction

Occupation	Job Duties
Electrician's helper	- prepare wire and conduits for installation - pull wire through conduits and holes in walls and floors - haul equipment and supplies
Labourer	- assist tradespeople as required - haul equipment and supplies - general maintenance

Intermediate Occupations in Facility Construction

Occupation	Job Duties
Catskinner	- operate the crawler tractor - maintain and repair equipment
Field clerk	- keep company records and time sheets - type correspondence and reports - communicate with public and company offices
Heavy equipment operator	- operate packers, backhoes, or graders - construct roads, ditches, bridges - access gravel supplies
Oral history specialist	- provide information on local history of an area - help identify archaeological concerns in an area - help identify flora and fauna and interpret traditional uses
Painter	- estimate quantity of materials needed - prepare surfaces as needed - apply primers and paints to interior and exterior parts of processing plant
Safety officer	- evaluate work procedures to identify potential hazards and plan to avoid these - advise supervisors and crews about safety standards and regulations - develop health and safety policies and programs - instruct safety courses
Tank truck operator	- drive trucks carrying bulk liquids to and from the site - follow safety regulations - conduct security checks and vehicle inspections - load and secure cargo
Vacuum truck operator	- drive vacuum trucks and operate the vacuum equipment on site - follow safety regulations - conduct security checks and vehicle inspections

Advanced Occupations in Facility Construction (1)

Occupation	Job Duties
Carpenter	- construct and erect buildings, scaffolding, concrete forms and other structures - read blueprints and design the work layout - cut, shape, and join wood materials - ensuring units are level and of sufficient size and shape
Concrete finisher	- place wet concrete into forms and spread it to depth required - manipulate the surface and edges to help control surface cracking - repair and apply special finishes to concrete surfaces
Electrician	- read building plans and electrical codes to determine wiring layout - prepare and install conduits and electrical fittings - install switches, relays, circuit breakers, and fuse enclosures - install electrical systems and related equipment
Foreman	- oversee the entire construction process - supervise workers and arrange schedules - submit progress reports to head office - arrange for the delivery of materials
Insulators	- read and interpret plans to determine insulation requirements - determine the type and amount of insulation - apply thermal and acoustical insulation on the industrial equipment, piping, etc.
Ironworker	- fabricate, join, and construct scaffolding and steel buildings - read specifications and design the work layout - assemble rigging to move materials - check alignment and join steel parts by bolting or welding
Pressure welder	- join and/or sever metals in pressure vessels, piping, girders - fabricate metal parts - weld parts, tools, machines, and equipment - develop a project plan and follow blueprints and layouts
Plumber	- plan and install piping systems used to transport water and gases - study building plans and specifications to design the layout for pipes - test pipe systems for leaks

Advanced Occupations in Facility Construction (2)

Occupation	Job Duties
Steamfitter-pipefitters	- lay out and assemble piping systems used for gas processing - study blueprints and specifications - measure, prepare, and install pipes, valves, and fittings - test equipment for leaks
Structural steel worker	- fabricate components for buildings, tanks, boilers, pressure vessels - read and interpret drawings to determine the sequence of tasks and materials required - lay out and shape steel parts
Surveyor	- operate theodolite, level, electronic measuring device, GPS, etc. - take direction from geophysicist in laying out seismic lines - keep records of field measurements

Entry-level Occupations in Gas Production

Occupation	Job Duties
Junior operator	- perform regular checks of unit - record temperatures, pressures, concentrations, and flows - test gas and chemicals at various stages - conduct minor equipment maintenance and repair - ensure safe storage of dangerous products - make adjustments to keep unit operating at optimum

Intermediate Occupations in Gas Production

Occupation	Job Duties
Gas field production operator	- check the "Christmas tree" to monitor flow and pressure of well - check valves, flowlines, and other systems - take temperature, pressure, and flow readings - take gas samples - bring on or shut in wells - maintain equipment
Unit operator	- conduct equipment inspections - start up and shut down equipment - review and organize records taken by junior operators - maintain and repair equipment - monitor controls and run product and boiler tests

Advanced Occupations in Gas Production

Occupation	Job Duties
Instrument mechanic	- install and repair measuring and control instruments - consult manuals to determine test and maintenance procedures - use testing devices to inspect and test instruments and systems - diagnose problems - work with engineers on design of plant units
Millwright	- install and repair equipment such as pumps, compressors, cooling systems, motors, and engines - use diagrams and schematic drawings to determine how machinery works - troubleshoot hydraulic, pneumatic, and programmable logic controls - may do some welding and fabrication of parts
Plant foreman	- carry out administration of plant - hire and train personnel - solve problems - conduct specialized tests
Senior operator	- monitor a number of control panels - oversee the operations of all units - advise unit operators on adjustments needed - notify plant staff of emergencies

APPENDIX C: TRAINING REQUIREMENTS

TRAINING AND EDUCATION REQUIREMENTS

The training and education requirements for occupations in oil and gas vary according to the relative level of complexity and responsibility they entail. The following tables describe the requirements for entry-level, intermediate, and advanced occupations in all phases of upstream activity. It should be noted that this information is representative of the *average* needs and expectations of industry. The specific experience and skills required for successful recruitment may vary from employer to employer.

Entry-level Seismic and Drilling Jobs

Occupation	Education	Mandatory Qualifications	Desirable Qualifications
Bucker Packer	Grade 9	- H2S, WHMIS, SFA - Chainsaw Safety - ATV Safety	Class 5 ATV Safety
Driller helper Shooter helper Observer helper		- H2S, WHMIS, SFA	
Gatekeeper Labourer Treeplanter Camp attendant		- none is generally required	
Leasehand Floorhand		- H2S, WHMIS, SFA - Class 5 licence	
Swamper		- TDG - Class 5	- H2S, WHMIS, SFA
Pump equipment operator helper		- TDG - Class 5	- H2S, WHMIS, SFA
Cook's helper		- none required	- Foodsafe Level 1

Intermediate Occupations in Seismic and Drilling

Occupation	Education	Mandatory Qualifications	Desirable Qualifications
Lead cutter	Grade 10	- H2S, WHMIS, SFA - Chainsaw Safety - ATV Safety - slashing experience	- supervisory skills
Seismic driller Shooter		- H2S, WHMIS, SFA - seismic experience - Class 5 licence	- Seismic Blaster's ticket
Heavy equipment operator		- TDG - Class 5 licence	- H2S, WHMIS, SFA - ATV Safety - Traffic Control ticket - Chainsaw Safety - equipment operation experience
Troubleshooter		- H2S, WHMIS, SFA - seismic experience – Class 5	- electronics training - equipment training
Motorhand Derrickhand Power tong operator		- H2S, WHMIS, SFA - Class 5 licence - rig experience	- advanced rig training
Line crew boss Truck driver		- Class 1 or 3 licence - airbrakes - TDG - seismic or driving experience	- H2S, WHMIS, SFA - oilfield driving training
Environmental monitor		- know local area, customs, etc.	- work experience
Cook		- Camp cooking or chef certificate - Foodsafe Level 2	- cooking experience
Well loggers/testers		- rig experience - Class 5 licence	- SFA, WHMIS, H2S - TDG, Blaster's ticket - high school diploma
Safety officer		- SFA, WHMIS - know regulations - work experience	
Vibrator operator		- TDG - Class 5 - seismic experience	- H2S, WHMIS, SFA

Advanced Occupations in Seismic and Drilling

Occupation	Education	Mandatory Qualifications	Desirable Qualifications
Seismic observer	Grade 12	- H2S, WHMIS, SFA - considerable seismic experience - Class 5 licence	- electronics training - supervisory skills
Rig manager		- H2S, WHMIS, SFA - considerable rig experience - 2nd Line Well Control ticket - Special Oilfield Boiler's ticket - Class 5 licence - TDG	- knowledge of mechanics - supervisory skills
Party manager		- Class 5 licence - considerable seismic experience	- supervisory skills - electronics training - H2S, WHMIS, SFA
Survey chief		- technical diploma or post-secondary degree in surveying	- work experience - supervisory skills
Pump equipment operator		- Class 1 or 3 licence - airbrakes - rig experience - TDG	- H2S, WHMIS, SFA - BOP ticket - oilfield driving training
Welder Heavy equipment mechanic	Grade 10	- Journeyman certificate	
Driller		- H2S, WHMIS, SFA - considerable rig experience - 1st Line BOP ticket - Class 5 licence	- supervisory skills
Operator		- H2S, WHMIS, SFA - considerable rig experience - Well Service BOP - Special Oilfield Boiler's ticket - Class 5 licence	- supervisory skills

Entry-level Occupations in Facility Construction

Occupation	Education	Mandatory Qualifications	Desirable Qualifications
Electrician's helper Labourer	Grade 9	- none generally required	- Class 5 licence - work experience

Intermediate Occupations in Facility Construction

Occupation	Education	Mandatory Qualifications	Desirable Qualifications
Catskinner Heavy equipment operator	Grade 10	- TDG - Class 5 licence	- H2S, WHMIS, SFA - ATV Safety - Traffic Control ticket - Chainsaw Safety - equipment operation experience
Oral history specialist		- knowledge of local history, special areas, archaeology	
Painter Concrete finisher Steelworker Ironworker		- extensive work experience in trade	- Journeyman ticket
Safety officer		- SFA, WHMIS - know regulations - work experience	
Vacuum truck operator Tank truck operator		- Class 1 or 3 licence - airbrakes - TDG - driving experience	- H2S, WHMIS, SFA - oilfield driving training

Advanced Occupations in Facility Construction

Occupation	Education	Mandatory Qualifications	Desirable Qualifications
Carpenter Electrician Insulator Pipefitter-steamfitter Plumber	Grade 10	- Journeyman ticket	
Construction foreman	Grade 12	- Journeyman ticket and extensive work experience in a trade	- supervisory skills - business training
Surveyor		- technical diploma or post-secondary degree in surveying	

Entry-level Occupations in Gas Production

Occupation	Education	Mandatory	Desirable
Junior operator	Grade 10	- Class 5 licence - H2S, WHMIS, SFA	- electronics or equipment training - Gas Field Operator training - high school diploma - Power Engineering certificate

Intermediate Occupations in Gas Production

Occupation	Education	Mandatory	Desirable
Field production operator Unit operator	Grade 10	- Class 5 licence - H2S, WHMIS, SFA - experience as helper or junior operator	- electronics or equipment training - Gas Field Operator training - high school diploma - Power Engineering certificate

Advanced Occupations in Gas Production

Occupation	Education	Mandatory	Desirable
Senior operator Plant foreman	Grade 10	- considerable plant experience	- electronics or equipment training - Gas Field Operator training - high school diploma - Power Engineering certificate - supervisory skills
Instrument mechanic Millwright	Grade 10	- Journeyman ticket	

APPENDIX D: HUMAN RESOURCES SURVEY

HUMAN RESOURCES SURVEY

PERSONAL INFORMATION

Name: ______________________________ Address: __________________________

Postal Code: ______________________ Telephone: ________________________

Please check off which age category you belong to:

☐ 15- 24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55 and over

WORK EXPERIENCE

1. Some entry-level jobs in the oil and gas industry require the same skills and experience that fields such as forestry and mining do. Work experience in the trades may also be useful. Please check off all of the fields below you have worked in, or tell us about other ones which we did not list:

☐ forestry ☐ mining ☐ surveying ☐ oil & gas

☐ carpentry ☐ heavy construction ☐ cooking ☐ mechanical

☐ ambulance ☐ wilderness guiding ☐ other (What field? __________________)

☐ other (What field? ________________)

2. For each box you checked above, describe the types of jobs you had in that field. Tell us what your job titles were, the approximate dates you were employed, your total months of experience, and your job duties. *Please look at the first example before you fill out this question!!!*

Field of work: FORESTRY
Jobs you held: FIRE FIGHTER, FELLER, CAMP ATTENDANT
Years you worked in: SUMMERS OF 1991, 1992, 1995
Months of experience: 12 MONTHS
Job duties: CUT AND SLASHED BRUSH, OPERATED CHAINSAW, WORKED WITH HELICOPTERS, DID SOME CARPENTRY, CLEANED CAMPS

Field of work: ____________________
Jobs you held: ____
Years you worked in: ____
Months of experience: ____

Job duties: ____________________

Field of work: ____________________
Jobs you held: ____________________
Years you worked in: ____________________
Months of experience: ____________________
Job duties: ____________________

Field of work: ____________________
Jobs you held: ____________________
Years you worked in: ____________________
Months of experience: ____________________
Job duties: ____________________

Field of work: ____________________
Jobs you held: ____________________
Years you worked in: ____________________
Months of experience: ____________________
Job duties: ____________________

3. Are you currently employed? ☐ Yes ☐ No

If you checked yes, please describe your current job below. (If you already described your current job above, please leave this part blank!!)

Job title: ____________________
Location: ____________________
Length of employment: ____________________
Job duties: ____________________

EDUCATION

1. What is the highest level of education that you have completed? (Check one)

☐ No formal education.
☐ Some school. Please indicate grade level: _____
☐ Completed high school.
☐ Some college. Describe subject matter: ____________________

☐ Completed college certificate or diploma. Please describe: ____________________

☐ Completed college/university diploma. Please describe: ____________________

2. Have you taken upgrading such as Developmental Studies or Adult Basic Education? If yes, please describe: ____________________

PREVIOUS TRAINING & SKILLS

1. The oil and gas industry may want to hire people who have certain courses and certificates. Some of these are listed below. Please check off only those courses which you **completed,** and where and when you received the training. There are spaces at the bottom of the list for you to include any other courses/certificates which you have **completed**.

	Institution	*Year*
☐ Standard First Aid		
☐ Industrial First Aid		
☐ WHMIS		
☐ Air Brakes		
☐ Camp Cook		
☐ CPR – Basic Rescuer		
☐ CPR – Child		
☐ Ambulance Attendant		
☐ Chainsaw Safety		
☐ Bear Awareness		
☐ Rigging & Hoisting		
☐ TDG		
☐ H_2S Alive		
☐ H_2S Awareness		
☐ Blaster's Certificate		
☐ Radio Operator's		
☐ Heavy Equipment Op.		
☐		
☐		
☐		
☐		
☐		
☐		
☐		

2. Even if you don't have a lot of certificates or courses, you may have valuable knowledge and skills gained from life experience, work, or leisure. Imagine that you are working for an oil and gas company operating out of a bush camp in the remote wilderness. What skills do you have that might be useful? (These may include land skills, knowing how to operate GPS units, ATVs, carpentry, plumbing, etc. Knowing how to repair and maintain equipment could also be important.)

3. Do you have a valid driver's licence? ☐ Yes If yes, what class? _____
☐ No

If you don't have a licence, are you willing to obtain one? ☐ Yes ☐ No

OIL & GAS TRAINING

1. How interested are you in taking further training for possible employment in the oil and gas industry?

☐ very interested ☐ somewhat interested ☐ not interested

2. What is the longest period of time that you would be willing to train in preparation for possible employment in the oil and gas industry? (check one)

☐ less than 1 week
☐ 1 to 4 weeks
☐ 5 to 16 weeks
☐ 1 year
☐ more than 1 year

3. Are you willing to travel to receive training? ☐ Yes ☐ No

If yes, where would you be willing to go? (Check all that apply)

☐ Whitehorse
☐ Fort Nelson
☐ Fort St. John
☐ Edmonton
☐ Calgary
☐ Prince George

4. What types of training would you prefer to take?

☐ weekend courses
☐ evening courses
☐ full-time courses, Monday to Friday
☐ independent study or distance learning courses

5. The early stages of oil and gas development require a variety of jobs to be performed. Some of these are listed below. Which of the following types of work would you be most interested in receiving training for? (Check all that apply)

☐ camp cooking
☐ surveying
☐ drilling crew
☐ safety officer/inspector
☐ camp support
☐ general labour
☐ heavy equipment operation
☐ First Aid officer
☐ line cutting
☐ driving

6. Later stages of oil and gas development involve many types of jobs which may require more technical and long-term training. How interested might you be in pursuing advanced training at some point in the future?

☐ very interested ☐ somewhat interested ☐ not interested

APPENDIX E: PRE-EMPLOYMENT TRAINING PROGRAM

PRE-EMPLOYMENT TRAINING PROGRAM

To meet the anticipated demand for approximately 18 individuals from the southeast Yukon to fill entry-level positions on seismic activities commencing in the fall of 1999, a program of Oil and Gas Pre-Employment Training is being recommended. The program would tentatively occur in February 1999 in the community of Watson Lake. Facilities at both Yukon College and Liard First Nation would be utilized for classroom space. The program would accommodate 18 people in total but remain flexible to accommodate those individuals who have already met some of the outcomes. Accordingly, some components may have fewer participants. Elements of the program have already been developed by Yukon College, YTG, and Aurora College and were delivered to residents of Fort McPherson and Old Crow in late November 1998.

The recommended program aims to facilitate employment in the oil and gas industry in several ways. First, it would provide trainees with the safety skills and certificates required for work in entry-level jobs in oil and gas exploration. Second, it would help to familiarize participants with the workings and expectations of the industry in advance. Last, it would help trainees explore tools and techniques to cope with the lifestyle adjustments associated with seismic exploration work.

These objectives would be accomplished through the delivery of three separate modules: Industry Orientation, Safety Skills, and Job Readiness. The Industry Orientation module would be geared towards all participants in the program. The Safety Skills module would need to allow for more flexibility in attendance, as some participants may have achieved some of its competencies. The Job Readiness module would ideally be delivered to all participants in the program as well. The general structure that is outlined and recommended may be further adapted to meet the more specific needs of both students and instructors.

It is further recommended that the program incorporate a literacy component if it is determined that participants are weak in this area. One option may be to combine the first training module with a reading assessment. If it becomes evident that a considerable number of participants have marked deficiencies in reading, writing, and math, literacy upgrading could be used to augment the other modules. A follow-up with participants who are subsequently employed with geophysical contractors would ideally be conducted to help refine and improve the training that is offered in following years.

1. INDUSTRY ORIENTATION MODULE (4 days)

Objective: To familiarize participants with the basic techniques and science behind hydrocarbon exploration/production, as well as the working "culture", expectations, and employment opportunities of the oil and gas industry.

Outcomes: By the end of this module, participants will:

- have been introduced to all phases of hydrocarbon resource development;
- be familiar with the definitions and terminology surrounding each phase;
- understand the basic techniques used in each phase of development;
- be familiar with the Workers' Compensation, Health and Safety Board regulations as they pertain to the industry;
- have a general understanding of the environmental impacts of the industry and how these can be mitigated;
- understand the general issues surrounding oil and gas development;
- be made aware of the opportunities that are potentially available in the oil and gas industry;
- understand industry expectations for employees.

Component descriptions:

- *Overview of the Oil and Gas Industry* (**2 days**): participants will be introduced to the definitions and terminology surrounding the exploration for and development of petroleum resources. The basic techniques and concepts behind geophysical surveys, seismic operations, drilling rigs, pipeline development, refineries, and offshore drilling will be discussed. The emphasis will be on providing a broad overview of the workings of industry.

- *WCHSB Regulations*_(**0.5 days**): participants will be introduced to the rules and regulations of the Yukon Workers' Compensation, Health, and Safety Board as they pertain to the oil and gas industry.

- *Overview of Environmental Impacts* (**1 day**): participants will explore the environmental implications and effects of all stages of oil and gas development. These include exploration, drilling, and pipeline development. Land reclamation and other techniques to mitigate these effects will be discussed. Participants will also examine the broader environmental and socioeconomic issues surrounding oil and gas development.

- *Industry Expectations and Job Opportunities* (**0.5 days**): participants will be given a broad overview of the types of employment that are available in the oil and gas industry, and the training and experience that is required. Each participant will be able to assess what opportunities and barriers apply to them based upon their level of education and training. Using goal-setting exercises, they will identify measures by which they may be able to overcome any barriers. The expectations of industry with respect to such issues as mobility, long work-shifts, and alcohol and drug abstinence will be discussed in the latter part of the session. Participants will understand that managing these demands is the key to advancement and success within the industry.

2. BASIC SAFETY MODULE (9 DAYS)

Objective: To allow participants to obtain the knowledge and skills that are needed to work safely in oil and gas exploration, and provide them with certification that is generally required by industry for entry-level employment in this phase of activity.

Outcomes: By the end of this module, participants will have:

- a basic knowledge of First Aid and CPR, accident management, and injury treatment;
- an awareness of the dangers associated with hydrogen sulphide (H2S) in the oil and gas industry, as well as techniques to protect themselves and others;
- the skills and knowledge to work safely around hazardous materials in the petroleum industry;
- knowledge of the federal regulations and procedures associated with the transportation and handling of dangerous goods in oil and gas industry operations;
- learned and practiced proper techniques for safe falling, bucking, and limbing for seismic surveys;
- learned and practiced proper techniques and skills for the safe operation of All Terrain Vehicles (ATVs) during seismic operations;
- an understanding of the basic principles and practices for driving safely on off-roads thoughout oil and gas activities.

Component descriptions:

- *Standard First Aid/CPR* (**3 days**): participants will be introduced to the fundamentals of administering first aid and CPR, with an emphasis on treatment in a remote setting. Topics will include basic physiology and anatomy, casualty management, head, spine, and soft tissue injuries, heart attack and stroke, environmental illnesses, and choking and bleeding. Certification: Participants will receive certification in basic first aid and CPR from either St. John Ambulance or Red Cross. Red Cross is valid for 2 years, and the CPR must be re-certified annually. St. John Ambulance is valid for 3 years, and it is generally recommended (but not mandatory) that CPR is re-certified annually.

- *H2S Alive* (**1 day**): this course provides an overview of the physical properties and health hazards of H2S, self-protection measures, and basic rescue techniques. Each student will be required to operate a self-contained breathing apparatus and detector tube device and perform rescue breathing on a mannequin. Certification: Participants will receive certification from PITS that is valid for 3 years.

- *WHMIS* (**0.5 days**): participants will cover the basics of the Workplace Hazardous Materials Information System, which is designed to provide information about materials used and found in the industrial setting. The

following topics will be covered: responsibilities of suppliers, importers, distributors, employers and employees; reading and understanding labels; identifiers; material safety data sheets; safe use, handling, storage, and disposal of controlled substances; and emergency procedures with controlled substances.
Certification: Participants will receive a certificate of completion that is valid indefinitely.

- *Transportation of Dangerous Goods* (**0.5 days**): participants will be introduced to the federal Transportation of Dangerous Goods legislation, which is designed to protect the public. Other topics include: classification, safety marks, documentation, safe handling, incident reporting, and emergency response.
  Certification: Participants will receive certification that is valid for 3 years.

- *Chainsaw safety and maintenance:* (**2 days**): participants will learn and apply proper techniques for safe falling, bucking, and limbing. Chainsaw maintenance and handling, personal protection, and falling practices are some of the topics covered.
  Certification: Participants will receive a certificate of completion from Yukon College that is recognized by WCHSB and is valid indefinitely.

- *Industrial All Terrain Vehicle* (ATV) *training* (**1 day**): through theory and hands-on practice, participants will gain knowledge of safe practices for operating ATVs in remote areas. (Note: the class can hold a maximum of 8 students, so two classes may need to be delivered)
  Certification: Participants will receive a certificate of completion from Blue Star Training or Northern Lights College that is valid indefinitely.

- *Off-highway defensive driving* (**1 day**): in a series of self-study video/workbook modules, participants will become familiar with practical, useable techniques and procedures for safe off-highway driving. Topics include: basic driving principles, safe vehicle operation, safety and survival equipment, off-highway driving practices, and driving practices for adverse conditions.
  Certification: Participants will receive a certificate of completion from PITS that is valid indefinitely.

3. JOB READINESS MODULE (4 DAYS)

Objective: The purpose of this module is to introduce participants to a variety of techniques which may help them cope with the workplace and lifestyle pressures of the oil and gas industry.

Outcomes: By the end of this module, participants will:

- understand the interwoven relationship between self, work, and domestic life;

- appreciate the responsibilities of teamwork;
- have had the opportunity to explore and apply different methods of diffusing and resolving conflict, anger, and stress;
- recognize and be able to identify a variety of support systems at work, in the community, and at home;
- be able to design and follow a budget and savings plan;
- be more aware of alcohol and drug abuse issues.

Component Descriptions:

- *Conflict Resolution* (**1 day**): participants will explore the nature of rotational employment and family dynamics and how conflicts can arise. Through role-playing exercises and the exploration of potentially difficult situations, participants will learn and apply basic conflict resolution skills to foster more proactive problem solving both in the field and when they return home.

- *Stress and Anger Management and Mobility* (**2 days**): participants will identify current stresses in their life and brainstorm different strategies for diffusing this stress. In addition, they will identify and discuss elements of work in the industry that could be consistent sources of stress and develop means to cope with these. The most crucial component of this will be managing the challenges of mobile employment and long periods away from home. The latter part of the component will examine what triggers anger and explore a variety of management techniques and strategies for diffusing situations that provoke anger.

- *Money Management* (**1 day**): using excerpts from *The Rich Trapper,* participants will examine budgeting and banking. The budgeting aspect will involve the use of *The Rich Trapper* booklet and practical budgeting exercises. By the end of this component, participants will have developed a personal budget based upon expected seasonal earnings. The emphasis will be on strategies to save without "hurting".

- *Substance Abuse Issues* (**1 day**): participants will identify triggers of substance abuse and explore strategies for coping, avoiding, and managing these triggers when they are in the field and at home. Role-playing will assist participants in learning to apply these skills to foster a healthier approach to diffusing stress and frustration and taking personal responsibility for themselves and their families' well-being.

4. PROGRAM TIMELINES

The Southeast Yukon Oil and Gas Training Needs Assessment Committee agreed that the proposed program should be scheduled during the month of February 1999 to allow for the use of local facilities and to avoid conflicts with other training occurring in the area. It was felt that all three modules should be offered in a 3-4 week period for maximum convenience. The option also remains to "stagger" the three modules several weeks apart, with the Job Readiness being delivered last. The primary objective is to complete the program in time for the anticipated seismic activity in the autumn of 1999.

5. PROGRAM COSTS

The anticipated cost for the delivery of the proposed program is about $31,000. This figure provides only a rough estimate; the final costs will depend on the particular instructors and institutions that are selected to deliver the training. For the purposes of the cost estimate, it is assumed that existing training capacity in the southeast Yukon will be utilized, specifically First Aid and WHMIS courses. Resources from Whitehorse are utilized for the delivery of the remainder of the Basic Safety module and the entire Job Readiness module. Industrial ATV and Off-Highway Defensive Driving courses are accessed from Blue Star Training and PITS, respectively. Many of the costs are based on Yukon College's budget for the oil and gas training course in Fort McPherson in November. Please refer to Figure E.1 for a cost breakdown.

6. TRAINING CONTACTS

Please see Appendix F for a contact list of training resources that may be available to deliver the scope of programming previously discussed.

Figure E.1 Costing for Proposed Training Program

Labour Costs			
Orientation module			
Local Instruction:	1 day	@ $400.00 per day	$ 400.00
Whitehorse Instruction:	4 days	@ $400.00 per day	$ 1600.00
Preparation:	12 days	@ $400.00 per day	$ 4800.00
Travel	1 day	@ $400.00 per day	$ 400.00
Room and Board	5 days	@ $150.00 per day	$ 750.00
Industry Safety module			
Local Instruction:	3 days	@ $200.00 per day	$ 600.00
Preparation:	3 days	@ $200.00 per day	$ 600.00
Whitehorse Instruction:	4 days	@ $400.00 per day	$ 1600.00
Preparation:	8 days	@ $400.00 per day	$ 3200.00
Travel:	1 day	@ $400.00 per day	$ 400.00
Room and Board	5 days	@ $150.00 per day	$ 750.00
Outside Instruction	2 days	@ $360.00 per day	$ 720.00
Mileage:	1600 km	@ $0.45/km	$ 720.00
Room and Board:	3 days	@ $150.00 per day	$ 450.00
Job Readiness module			
Misc. Instruction:	5 days	@ $400.00 per day	$ 2000.00
Preparation:	10 days	@ $400.00 per day	$ 4000.00
Travel	3 day	@ $400.00 per day	$ 1200.00
Room and Board	5 days	@ $150.00 per day	$ 750.00
Total Labour			**$24940.00**
Operations and Maintenance			
Communications			$ 300.00
Program Texts	20 students	@ $33.00 per text	$ 660.00
Program Materials			$ 100.00
Material Replacement Costs			$ 700.00
Classroom Rental			$ 0.00
Freight			$ 100.00
Total Operations and Maintenance			**$ 1860.00**
Total Labour + O&M			**$26800.00**
Program Administration Fee @ 15%			$4020.00
GST @ 7% (embedded in costs)			$0.00
TOTAL COST			**$ 30820.00**

APPENDIX F: TRAINING RESOURCES DIRECTORY

TRAINING RESOURCES DIRECTORY

A preliminary directory has been compiled to aid in identifying resource persons who may be able to provide training in both the Liard and larger Yukon region. The directory lists any specialties that individuals have that pertain directly to the scope of training that is outlined in Appendix E. In this sense, it does not aim to provide a comprehensive description of all the services each individual provides. It remains at the discretion of the prospective client to determine which individuals will be best suited for their particular needs.

Yukon Resources

Industry "Experts"

Ron Daub	*Oil & gas career professional, based in Whitehorse; 20+ years experience in the industry internationally* Contact: 667-7194
Jim Hartle	*Oil & gas career professional, based in Watson Lake* Contact: 536-2138
Rod Moore	*Instructor for Professional Studies Division at Yukon College; currently providing this training to residents of Fort McPherson and Old Crow* Contact: 668-8748
Gerald Vigeant	*Education Assistant in Watson Lake; employed with Esso Resources in the Arctic for 5 years in expediting/recruiting; background in human resources* Contact: 536-7581

Basic Safety Training

Brad Beaumont	*Instructor for Yukon College Watson Lake campus; teaches WHMIS* Contact: 536-2478
Jean Kapala	*Program Manager, Public Health and Safety at Yukon College; can arrange for First Aid, WHMIS, TDG training* Contact: 668-8260
Lance Koschzeck	*Manager, St. John Ambulance; can arrange for First Aid training* Contact: 668-5001

Rod Moore	*Instructor for Professional Studies Division at Yukon College; teaches H2S Alive, TDG, WHMIS, Standard First Aid* Contact: 668-8748
Jenny Skelton	*Instructor, Yukon College Watson Lake campus; teaches First Aid* Contact: 536-2478
Bob Thompson	*Instructor for Transportation of Dangerous Goods course* Contact: 633-2188

Lifeskills/Job Readiness

Shirley Bauer	*Private counsellor; specializes in health and social issues.* Contact: 536-7105
Christiane Boisjoly	*Specializes in conflict resolution and stress management; can consult with partner in Calgary who has extensive experience in industry; community experience.* Contact: 668-6794
Kim Chapman	*Family counsellor, Yukon Family Services Assocation.* Contact: 536-2330
Rosemary Couch	*Specializes in First Nations peacemaking, conflict resolution; a Kaska member; community experience.* Contact: 668-3813
Nansi Cunningham	*Wellness consultant and facilitator; offers workshops in career, stress, and self-management, as well as communication and self-esteem; community experience.* Contact: 633-5226
Esther Dobbs	*Provides wide range of life skills training, including team building, relationship training, anger management, substance abuse issues, etc. Extensive work with First Nations and in the communities. Worked for Esso Resources in the NWT recruiting personnel and assisting local communities in job-related difficulties.* Contact: 668-3575
Harold Gatensby	*Specializes in peacemaking with communications and dispute resolution as a focus; extensive First Nations and community experience; co-facilitates with Mark Wedge.* Contact: 821-4251

Phil Gatensby	*Offers services in self empowerment, conflict resolution, anger management, and substance abuse issues; extensive work with First Nations and in communities.* Contact: 633-3818
Caroline Hayes	*Offers services in mediation, dispute resolution and communication training; community experience* Contact: (867) 634-2765
Sherri Lockwood	*Specializes in stress and anger management, and conflict resolution; community experience.* Contact: 668-4948
Eleanor Millard	*Currently delivering a personal development and communication component for trades at Yukon College.* Contact: 821-3821
Dawn Marino	*Instructor, Carmacks Yukon College campus; experience in a wide range of literacy/life skills type of training developed in conjunction with mining industry.* Contact: 863-5806
Lynn Ogden	*Financial Advisor with Ogden Felidichuk; offers workshops in personal banking and budgeting; community experience* Contact: 668-6500
Madelene Sauve	*Specializes in anger management and confict resolution; extensive community and First Nations experience.* Contact: 633-5110
Marilyn J. Siwak	*Provides life skills training and group facilitation in communication, problem solving, goal setting, and decision making.* Contact: 633-4269
Jim Smarch	*Counsels in life skills, alcohol and drug problems, cultural awareness, and anger management; extensive work with First Nations and in communities; co-facilitates with Esther Dobbs (see above).* Contact: 633-3764
Marianne Watson	*YTG Social Services worker* Contact: 536-2232
Mark Wedge	*Specializes in peacemaking with communications and dispute resolution as a focus; extensive First Nations and community experience; co-facilitates with Harold Gatensby* Contact: 399-3507

Outside Resources

Leah Bradish	*Coordinator, Continuing Education, Northern Lights College in Fort St. John; can arrange for full range of basic safety training* Contact: (250) 785-6981
Marjorie Brent	*Manager, Blue Star First Aid and Safety Training* Contact: (250) 785-7233
Holly Conley	*Safety Orientation Program Coordinator, PITS; can arrange for the in-house delivery of Safety Orientation package.* Contact: 1-800-667-5557
Eric Sehn	*Coordinator, Continuing Education, Northern Lights College at Fort Nelson; can arrange for basic safety training* Contact: (250) 774-2741
Jim Shaffer	*Safety Training Coordinator, PITS; can advise on advanced safety training* Contact: (403) 955-6006
Doug vanEden	*Safety Training Coordinator, PITS; can advise on advanced safety training* Contact: (403) 250-0879
Dave Walls	*Dean, Energy and Natural Resources Department at Southern Alberta Institute of Technology (SAIT)* Contact: (403) 284-8774